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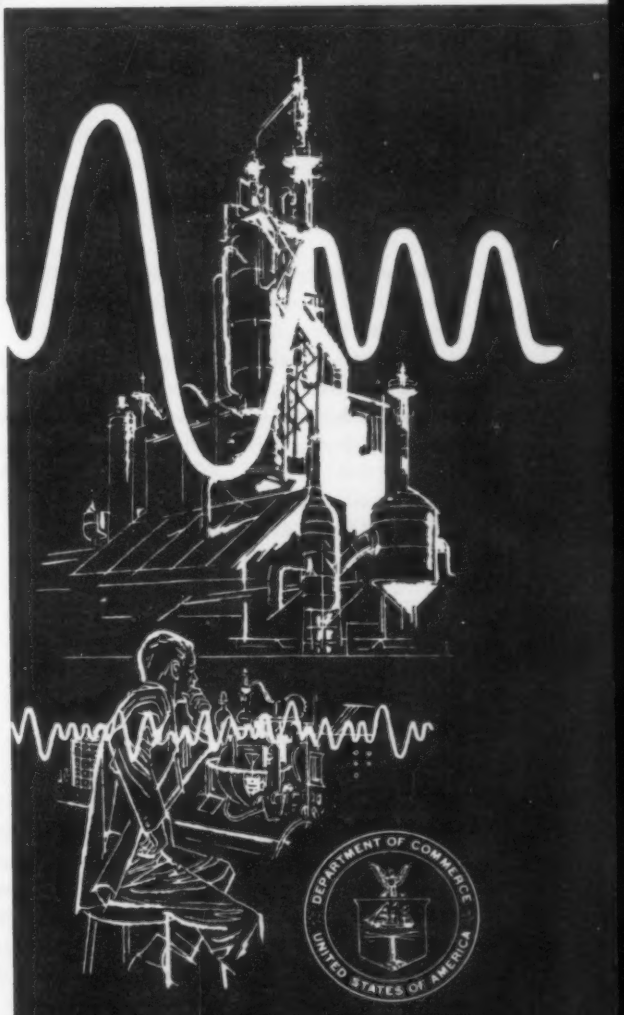

U. S. DEPARTMENT OF COMMERCE
BUSINESS AND DEFENSE SERVICES ADMINISTRATION
Office of Technical Services

U.S. GOVERNMENT RESEARCH REPORTS

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Luther H. Hodges, *Secretary*

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***ABSORPTION**

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(GUIDED MISSILES+ SURFACE TO AIR+ COMMAND SYSTEMS+ CONTROL SYSTEMS+ *COMBAT INFORMATION CENTERS+ RADAR STATIONS+ DISPLAY SYSTEMS+ GROUND SUPPORT EQUIPMENT+ *AIR CONDITIONING EQUIPMENT+ AIR+ *PARTICULATE FILTERS+ EFFECTIVENESS+ TESTS.) (AIR CONDITIONING EQUIPMENT+ TEMPERATURE+ LOW TEMPERATURE RESEARCH+ TESTS+ *RADAR TRAILERS.)
ORDNANCE MISSION+ WHITE SANDS MISSILE RANGE+ N. MEX.
AD-274 590 62-3-2 DIV. 13

***AIRFOILS**

(BLUNT BODIES+ *AIRFOILS+ CONICAL BODIES+ HEAT TRANSFER+ HYPERSONICS.) (*GAS FLOW+ *COMBUSTION CHAMBER GASES+ PRESSURE+ WATER VAPOR+ CONDENSATION.)
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***AIRFRAMES**

(*BOOSTER ROCKETS+ *AIRFRAMES+ *BEAMS+ VIBRATION+ EQUATIONS+ MATHEMATICAL ANALYSIS+ MATHEMATICAL PREDICTION+ MATRIX ALGEBRA.)
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(*AERIAL PROPELLERS+ *AIRPLANE ENGINES+ *AIRPLANE ENGINE MOUNTS+ GYROSCOPES+ DYNAMICS+ STABILITY+ OSCILLATION+ DAMPING+ MATHEMATICAL ANALYSIS+ DIFFERENTIAL EQUATIONS.)
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***AIRPLANE ENGINES**

(*AERIAL PROPELLERS+ *AIRPLANE ENGINES+ *AIRPLANE ENGINE MOUNTS+ GYROSCOPES+ DYNAMICS+ STABILITY+ OSCILLATION+ DAMPING+ MATHEMATICAL ANALYSIS+ DIFFERENTIAL EQUATIONS.)
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***ALBEDO**

(ARCTIC REGIONS+ *ALBEDO (ASTRONOMY)+ CLOUDS+ INFRARED RADIATION.)
MCGILL U. (CANADA).
AD-274 537 62-3-2 DIV. 2

***ALGEBRAIC TOPOLOGY**

(*ALGEBRAIC TOPOLOGY+ *RELATIVITY THEORY+ *GEODESICS+ PARTICLE TRAJECTORIES+ LIGHT TRANSMISSION.) (*STATISTICAL TESTS+ PARTIAL DIFFERENTIAL EQUATIONS+ TRANSFORMATIONS (MATHEMATICS).
RAND CORP.+ SANTA MONICA+ CALIF.
AD-274 598 62-3-2 DIV. 15

***ALGEBRAS**

(THEORY OF REPRESENTATION FOR BOOLEAN *ALGEBRAS.) (FUNCTIONS+ POLYNOMIALS+ OPERATORS (MATHEMATICS)+ PARTIAL DIFFERENTIAL EQUATIONS+ FUNCTIONAL ANALYSIS.)
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AD-274 766 62-3-2 DIV. 15

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AD-274 588 62-3-2 DIV. 17

***ALUMINATES**

(*SINGLE CRYSTALS+ *CRYSTALS+ MICA+ THIN FILMS+ GROWTH+ *CRYSTALLIZATION+ ZONE MELTING+ MANUFACTURING METHODS+ CRYSTAL OVENS+ LABORATORY EQUIPMENT+ *BIBLIOGRAPHY.) (PRODUCTION+ SHEETS+ SOLIDS+ SOLUTIONS+ *POTASSIUM COMPOUNDS+ ALUMINUM COMPOUNDS+ *RUBIDIUM COMPOUNDS+ BORON COMPOUNDS+ *FLUORIDES+ *ALUMINATES.)
PENNSALT CHEMICALS CORP.+ PHILADELPHIA+ PA.
AD-274 832 62-3-2 DIV. 26

***ALUMINUM ALLOYS**

(SHEETS+ *ALUMINUM ALLOYS (7075-T6 AND X7279-T6)+ ZINC ALLOYS+ MAGNESIUM ALLOYS+ SENSITIVITY+ FRACTURE (MECHANICS)+ PROPAGATION+ *FATIGUE (MECHANICS)+ PARTICLES+ MECHANICAL PROPERTIES+ DEFORMATION+ PLASTICITY+ STRESSES.) ALLOYS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION+ WASHINGTON+ D. C.
AD-274 569 62-3-2 DIV. 17

*ALUMINUM ALLOYS (2024-T3)+ COPPER ALLOYS+ MAGNESIUM ALLOYS+ MANGANESE ALLOYS+ NEUTRON BOMBARDMENT+ HEAT TREATMENT+ AGING+ RADIATION EFFECTS+ MECHANICAL PROPERTIES+ HARDNESS+ METALLURGICAL ANALYSIS+ X-RAY DIFFRACTION ANALYSIS+ MICROSTRUCTURE.
AERONAUTICAL RESEARCH LAB.+ OFFICE OF AEROSPACE RESEARCH+ WRIGHT-PATTERSON AIR FORCE BASE+ OHIO.
AD-274 716 62-3-2 DIV. 17

***ALUMINUM COMPOUNDS**

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NEW YORK U.+ N. Y.
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(*SINGLE CRYSTALS+ *CRYSTALS+ MICA+ THIN FILMS+ GROWTH+ *CRYSTALLIZATION+ ZONE MELTING+ MANUFACTURING METHODS+ CRYSTAL OVENS+ LABORATORY EQUIPMENT+ *BIBLIOGRAPHY.) (PRODUCTION+ SHEETS+ SOLIDS+ SOLUTIONS+ *POTASSIUM COMPOUNDS+ ALUMINUM COMPOUNDS+ *RUBIDIUM COMPOUNDS+ BORON COMPOUNDS+ *FLUORIDES+ *ALUMINATES.)
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***AMINES**

(*POLYMERS+ *ELASTOMERS+ *SILICON COMPOUNDS+ *NITROGEN COMPOUNDS+ *AMINES+ AZO RADICALS+ SYNTHESIS+ *POLYMERIZATION+ CHEMICAL REACTIONS.) (STABILITY+ TEMPERATURE+ HYDROLYSIS.) (METHYL RADICALS+ SILICONES+ HETEROCYCLIC COMPOUNDS+ ETHYL RADICALS+ PHENYL RADICALS+ OXYGEN COMPOUNDS+ VINYL RADICALS+ CHLORIDES.)
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AD-274 528 62-3-2 DIV. 4

***AMMONIA**

(*GASES+ GAS IONIZATION+ METALS+ SOLVATES+ VAPORS+ IONIZATION+ IONS.) (SOLVENT ACTION+ *AMMONIA+ CHEMICAL REACTIONS+ PHYSICAL PROPERTIES+ *TEMPERATURE COEFFICIENT OF REACTIVITY+ THERMODYNAMICS.) (SOLUTIONS+ SODIUM+ AMMONIA.)
UNIFIED SCIENCE ASSOCIATES+ INC.+ PASADENA+ CALIF.
AD-274 615 62-3-2 DIV. 25

***AMPLITUDE MODULATION**

(*PULSE MODULATION+ *CODING+ *RADIO RELAY SYSTEMS+ *MICROWAVE RELAY SYSTEMS+ *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION+ *MULTIPLEX TRANSMISSION+ NOISE (RADIO)+ SOURCES+ SIGNAL-TO-NOISE RATIO+ RADIOFREQUENCY+ ERRORS+ DISTORTION+ ATTENUATION+ DETECTORS+ AUDIOFREQUENCY+ MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS+ NEW YORK.
AD-274 840 62-3-2 DIV. 5

***ANALOG-TO-DIGITAL CONVERTERS**

(*VOICE COMMUNICATION SYSTEMS+ *DIGITAL SYSTEMS+ DATA STORAGE SYSTEMS+ *SPEECH TRANSMISSION+ CODING+ INTELLIGIBILITY+ AUDIOFREQUENCY+ SIDEBANDS+ DESIGN+ TESTS.) (TRANSISTOR AMPLIFIERS+ BAND-SELECTIVE AMPLIFIERS+ BAND-PASS AMPLIFIERS+ BAND-PASS FILTERS+ ACOUSTIC FILTERS+ TIMING CIRCUITS.) (PULSE GENERATORS+ *PULSE MODULATION+ PULSE TRANSMITTERS+ CRYSTAL OSCILLATORS+ *DATA PROCESSING SYSTEMS+ *ANALOG-TO-DIGITAL CONVERTERS.)
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DECO ELECTRONICS+ INC.+ LEESBURG+ VA.
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***ANTENNAS**

(VERY LOW FREQUENCY+ RADIO TRANSMITTERS+ *ANTENNAS+ *ANTENNA MASTS+ MODEL TESTS+ DESIGN+ FEASIBILITY STUDIES.) (*RADIO NAVIGATION+ AIR FORCE EQUIPMENT+ *RADIO TOWERS+ NEW YORK+ ANTENNA RADIATION PATTERNS+ RADIOFREQUENCY POWER+ MEASUREMENT+ TESTS.)
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***ANTIFERROMAGNETISM**

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AD-274 471 62-3-2 DIV. 25

***ARMORED VEHICLES**

(*TANKS; *ARMORED VEHICLES; *TRACKED VEHICLES.) (*UNDERWATER NAVIGATION; SNORKEL; UNDERWATER COMMUNICATION SYSTEMS; FLOTATION.)
FOOD MACHINERY AND CHEMICAL CORP.; SAN JOSE; CALIF.
AD-274 817 62-3-2 DIV. 22

***ASTRONOMY**

(*INTERSTELLAR MATTER; MAGNETIC FIELDS; TERRESTRIAL MAGNETISM; GRAVITY; SOLAR ENERGY; VAN ALLEN RADIATION BELTS; ULTRAVIOLET RADIATION; SUN.) (MOON; PLANETARY ATMOSPHERES; TERRAIN; GEOLOGY.) (MARS; VENUS; JUPITER; SATURN; URANUS; PLUTO.) (GALAXIES; STARS; SPECTROGRAPHIC ANALYSIS.) (*ASTRONOMY; *ASTROPHYSICS.) *PLANETS.
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AD-274 652 62-3-2 DIV. 2

***ASTROPHYSICS**

(*INTERSTELLAR MATTER; MAGNETIC FIELDS; TERRESTRIAL MAGNETISM; GRAVITY; SOLAR ENERGY; VAN ALLEN RADIATION BELTS; ULTRAVIOLET RADIATION; SUN.) (MOON; PLANETARY ATMOSPHERES; TERRAIN; GEOLOGY.) (MARS; VENUS; JUPITER; SATURN; URANUS; PLUTO.) (GALAXIES; STARS; SPECTROGRAPHIC ANALYSIS.) (*ASTRONOMY; *ASTROPHYSICS.) *PLANETS.
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***ATMOSPHERE**

(*ATMOSPHERE; TEMPERATURE; WATER VAPOR; *TURBULENCE; BOUNDARY LAYER; WIND; MEASUREMENT; STATISTICAL ANALYSIS.) HYGROMETERS.
ROUND HILL FIELD STATION; MASS. INST. OF TECH.; SOUTH DARTMOUTH.
AD-274 494 62-3-2 DIV. 2

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U. (ITALY).
AD-274 728 62-3-2 DIV. 25

***ATMOSPHERE MODELS**

(WIND; GASES; BAROMETRIC PRESSURE; DENSITY; SOUND VELOCITY; THERMAL CONDUCTIVITY.) *ATMOSPHERE MODELS.
GENERAL DYNAMICS/ASTRONAUTICS; SAN DIEGO; CALIF.
AD-274 477 62-3-2 DIV. 2

***ATTENUATION**

(*RADAR SIGNALS; RADAR PULSES; SCATTERING; *ATTENUATION; IONOSPHERIC PROPAGATION; *IONOSPHERE; TEMPERATURE; WAVE TRANSMISSION; *ELECTROMAGNETIC WAVE REFLECTIONS; INTEGRAL TRANSFORMS; SPECTROGRAPHIC ANALYSIS.)
CORNELL U.; ITHACA; N. Y.
AD-274 731 62-3-2 DIV. 8

***AUDIO AMPLIFIERS**

(AUDIOFREQUENCY; *TRANSISTORS FOR TRANSISTOR AMPLIFIERS; *AUDIO AMPLIFIERS; AMPLIFIERS; DESIGN; *MANUFACTURING METHODS; AUTOMATIC; PRODUCTION; GERMANIUM; PROCESSING; MATERIALS; ALLOYS; ELECTRICAL PROPERTIES; SURFACES; ENCAPSULATION; TEST EQUIPMENT; RELIABILITY; MECHANICAL PROPERTIES.)
WESTERN ELECTRIC CO.; LAURELDALE; PA.
AD-274 847 62-3-2 DIV. 8

***AURORAE**

(*AURORAL; TERRESTRIAL MAGNETISM; IONOSPHERE; ELECTRIC CURRENTS; MAPS.)
GEOPHYSICAL INST.; U. OF ALASKA; COLLEGE.
AD-274 463 62-3-2 DIV. 2

(*AURORAL; IONIZATION; DRIFT; MEASUREMENT; RADIO WAVES; REFLECTION.)
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN).
AD-274 737 62-3-2 DIV. 2

(*AURORAL; RADIO WAVES; VERY HIGH FREQUENCY; REFLECTION; DIURNAL VARIATIONS; PERIODIC VARIATIONS; *TERRESTRIAL MAGNETISM.)
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN).
AD-274 736 62-3-2 DIV. 2

***AVIATION FUELS**

(*AVIATION FUELS; *JET ENGINE FUELS; *ROCKET FUELS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; THERMODYNAMICS; HANDBOOKS.) (SOLUBILITY OF AIR; NITROGEN; ETHANES.) (HYDROCARBONS; NAPHTHALENES.) VISCOSITY; DENSITY; SPECIFIC HEAT; ENTHALPY; ENTROPY; VAPORIZATION.
INGLEWOOD LAB.; THOMPSON PRODUCTS; INC.; CALIF.
AD-274 623 62-3-2 DIV. 10

***AXIAL-FLOW COMPRESSOR BLADES**

(*AXIAL FLOW COMPRESSORS; *CENTRIFUGAL PUMPS; *AXIAL FLOW COMPRESSOR BLADES; COMPRESSOR ROTORS; SUBSONIC FLOW; AERODYNAMICS; MATHEMATICAL ANALYSIS; DESIGN.)
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AD-274 573 62-3-2 DIV. 9

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(*AXIAL FLOW COMPRESSORS; *CENTRIFUGAL PUMPS; *AXIAL FLOW COMPRESSOR BLADES; COMPRESSOR ROTORS; SUBSONIC FLOW; AERODYNAMICS; MATHEMATICAL ANALYSIS; DESIGN.)
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AD-274 573 62-3-2 DIV. 9

***BACKWARD-WAVE OSCILLATORS**

(*BACKWARD-WAVE OSCILLATORS; *RADIOFREQUENCY GENERATORS; PULSE TRANSFORMERS; PULSE GENERATORS; FEASIBILITY STUDIES; DESIGN; MANUFACTURING METHODS.) (MICROWAVES; *WAVEGUIDES; ELECTRONIC CIRCUITS; MICROWAVE NETWORKS; SUPERHIGH FREQUENCY; ELECTROFORMING; STANDING WAVE RATIOS; MEASUREMENT.) (*ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTRON GUNS; BEAM POWER TUBES; ANODES (ELECTRON TUBES); MAGNETIC FIELDS; FOCUSING; MATERIALS; TEST EQUIPMENT.)
WATKINS-JOHNSON CO.; PALO ALTO; CALIF.
AD-274 718 62-3-2 DIV. 8

***BAND-PASS FILTERS**

(*MICROWAVE AMPLIFIERS; *TRAVELLING WAVE TUBES; EXTREMELY HIGH FREQUENCY; SIGNAL-TO-NOISE RATIO; NOISE (RADIO); REDUCTION; *BAND-PASS FILTERS; TUNING DEVICES; YTTRIUM; GARNET.) (CATHODES (ELECTRON TUBES); MINIATURE ELECTRONIC EQUIPMENT; MANUFACTURING METHODS; TANTALUM.) (CATHODES (ELECTRON TUBES); HEATING; ANODES; HELIXES; STANDING WAVE RATIOS; FREQUENCY SHIFT; SENSITIVITY; MAGNETS; FOCUSING; TESTS.)
WATKINS-JOHNSON CO.; PALO ALTO; CALIF.
AD-274 639 62-3-2 DIV. 8

***BAND-SELECTIVE AMPLIFIERS**

(*VOICE COMMUNICATION SYSTEMS; *DIGITAL SYSTEMS; DATA STORAGE SYSTEMS; *SPEECH TRANSMISSION; CODING; INTELLIGIBILITY; AUDIOFREQUENCY; SIDEBANDS; DESIGN; TESTS.) (TRANSISTOR AMPLIFIERS; BAND-SELECTIVE AMPLIFIERS; BAND-PASS AMPLIFIERS; BAND-PASS FILTERS; ACOUSTIC FILTERS; TIMING CIRCUITS.) (PULSE GENERATORS; *PULSE MODULATION; PULSE TRANSMITTERS; CRYSTAL OSCILLATORS; *DATA PROCESSING SYSTEMS; *ANALOG-TO-DIGITAL CONVERTERS.)
BOLT, BERANEK, AND NEWMAN, INC.; CAMBRIDGE; MASS
AD-274 466 62-3-2 DIV. 5

***BEAMS**

(*BOOSTER ROCKETS; *AIRFRAMES; *BEAMS; VIBRATION; EQUATIONS; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; MATRIX ALGEBRA.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 582 62-3-2 DIV. 9

***BIBLIOGRAPHY**

(*BIBLIOGRAPHY; REPORTS; *GUIDED MISSILES; GUIDED MISSILE BOOSTERS; SPACESHIPS.) (MAGNETOHYDRODYNAMICS; ELECTROMAGNETIC WAVES; FLUID MECHANICS.) (BERYLLIUM COMPOUNDS; OXIDES.) PROPELLANTS; COUNTERMEASURES; AERODYNAMICS.
AEROSPACE CORP.; EL SEGUNDO; CALIF.
AD-274 305 62-3-2 DIV. 12

(*BIBLIOGRAPHY; *GUIDED MISSILES.) (*RADAR; *RADAR ANTENNAS; RADAR ANTIJAMMING; RADAR DECEPTION; RADAR JAMMING; COUNTERMEASURES; RADAR TRACKING.) (INFRARED PHOTOCONDUCTORS; PHOTOELECTRIC MATERIALS; DETECTION.) *GUIDED MISSILE FUZES; FERROELECTRIC MATERIALS; SCIENTIFIC RESEARCH; CHEMISTRY; POLYMERS.
NAVAL ORDNANCE LAB.; CORONA; CALIF.
AD-274 561 62-3-2 DIV. 12

(*BIBLIOGRAPHY; *CRYSTALS; GROWTH; PREPARATION; LASERS.) (*GARNET; *RUBY; *CORUNDUM; *SPINELS; SAPPHIRES; FERRITES; METALLIC COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE; SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP.; EL SEGUNDO; CALIF.
AD-274 642 62-3-2 DIV. 14

(*BIBLIOGRAPHY; *METALS; *HEAT RESISTANT ALLOYS; *CERAMIC MATERIALS; *REFRACTORY MATERIALS; ALLOYS.) (STEEL; STAINLESS STEEL; IRON ALLOYS; NICKEL ALLOYS; BERYLLIUM; TITANIUM; MAGNESIUM; NIOBIUM; CHROMIUM; MOLYBDENUM; TANTALUM; VANADIUM; TUNGSTEN.)
DEFENSE METALS INFORMATION CENTER; COLUMBUS; OHIO.
AD-274 649 62-3-2 DIV. 17

(*SEISMIC WAVES; MATHEMATICAL ANALYSIS; DIGITAL COMPUTERS; *PROGRAMMING; *BIBLIOGRAPHY.)
ACOUSTICS AND SEISMICS LAB.; U. OF MICHIGAN; ANN ARBOR.
AD-274 659 62-3-2 DIV. 30

(*HUMAN ENGINEERING; *BIBLIOGRAPHY.)
ARMED SERVICES TECHNICAL INFORMATION AGENCY; ARLINGTON; VA.
AD-274 800 62-3-2 DIV. 28

(*SINGLE CRYSTALS; *CRYSTALS; MICA; THIN FILMS; GROWTH; *CRYSTALLIZATION; ZONE MELTING; MANUFACTURING METHODS; CRYSTAL OVENS; LABORATORY EQUIPMENT; *BIBLIOGRAPHY.) (PRODUCTION; SHEETS; SOLIDS; SOLUTIONS; *POTASSIUM COMPOUNDS; ALUMINUM COMPOUNDS; *RUBIDIUM COMPOUNDS; BORON COMPOUNDS; *FLUORIDES; *ALUMINATES.)
PENNSALT CHEMICALS CORP.; PHILADELPHIA; PA.
AD-274 832 62-3-2 DIV. 26

*BIBLIOGRAPHY; *MASERS; *LASERS; LIGHT; AMPLIFIERS; MICROWAVE AMPLIFIERS.
SPACE TECHNOLOGY LABS.; INC.; REDONDO BEACH; CALIF.
AD-274 843 62-3-2 DIV. 25

***BINDERS**

(HIGH TEMPERATURE RESEARCH; *RADOMES; MATERIALS; REINFORCING MATERIALS; CERAMIC MATERIALS; CERAMIC FIBERS; ASBESTOS FIBER; MICA; ALUMINUM COMPOUNDS; PHOSPHATES; SILICON COMPOUNDS; DIOXIDES; GLASS; SPHERES; *LAMINATES; *BINDERS; FILAMENT WOUND CONSTRUCTION.) MECHANICAL PROPERTIES; DIELECTRIC PROPERTIES; VISCOSITY.
GENERAL ELECTRIC CO.; SCHENECTADY; N. Y.
AD-274 732 62-3-2 DIV. 8

***BISMUTH COMPOUNDS**

(SEMICONDUCTORS; INTERMETALLIC COMPOUNDS; *BISMUTH COMPOUNDS; *TELLURIDES; SELENIDES; *THERMAL CONDUCTIVITY; LATTICES; THERMOELECTRICITY; CHEMICAL IMPURITIES; TEMPERATURE.) BISMUTH ALLOYS; TELLURIUM ALLOYS; SELENIUM ALLOYS.
BATTELLE MEMORIAL INST.; COLUMBUS; OHIO.
AD-274 717 62-3-2 DIV. 25

***BLACKBODY RADIATION**

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION.) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS.) (*THORIUM COMPOUNDS; OXIDES.) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS.)
GENERAL ELECTRIC CO.; CINCINNATI; OHIO.
AD-274 634 62-3-2 DIV. 14

***BLAST**

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS.) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE.) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO.; GREENWICH; CONN.
AD-274 646 62-3-2 DIV. 13

***BLUNT BODIES**

(*BLUNT BODIES; HYPERSONICS; SUPERSONICS; AERODYNAMICS; *SHOCK WAVES; MATHEMATICAL ANALYSIS; SERIES; INTEGRAL EQUATIONS; DIFFERENTIAL EQUATIONS; THEORY.)
STANFORD U.; CALIF.
AD-274 612 62-3-2 DIV. 9

***BODIES OF REVOLUTION**

(*BODIES OF REVOLUTION; SUPERSONICS; *OSCILLATION; HARMONIC OSCILLATORS; FLUTTER; LIFT; PITCH; VELOCITY; MOMENTS; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; POTENTIAL THEORY; THEORY.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 574 62-3-2 DIV. 9

(CYLINDRICAL BODIES; *BODIES OF REVOLUTION; OGIVE; WIND TUNNEL MODELS; SUBSONIC FLOW; LOAD DISTRIBUTION; INTERFERENCE; *VORTICES; WAKES; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 587 62-3-2 DIV. 9

***BOOSTER ROCKETS**

(*SATELLITE VEHICLES; *BOOSTER ROCKETS; FUEL SYSTEMS; *LIQUID ROCKET PROPELLANTS.) (*PROPELLANT TANKS; TEMPERATURE CONTROL; VENTILATION; SPACE ENVIRONMENTAL CONDITIONS; *WEIGHTLESSNESS; ACCELERATION.) (ROCKET FUELS; ROCKET OXIDIZERS; SURFACE PROPERTIES; SURFACE TENSION.) GAS PRESSURIZATION SYSTEMS.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE, CALIF.
AD-274 482 62-3-2 DIV. 27

(*BOOSTER ROCKETS; *AIRFRAMES; *BEAMS; VIBRATION; EQUATIONS; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; MATRIX ALGEBRA.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 582 62-3-2 DIV. 9

***BORIDES**

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION;) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS;) (*THORIUM COMPOUNDS; OXIDES;) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS;) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS;)
GENERAL ELECTRIC CO.; CINCINNATI, OHIO.
AD-274 654 62-3-2 DIV. 14

***BORON COMPOUNDS**

(*HEAT RESISTANT POLYMERS; *POLYMERS; METALORGANIC COMPOUNDS; *BORON COMPOUNDS; *PHOSPHORUS COMPOUNDS; ORGANOBORANES; BORINES; PENTABORANES; DECABORANES; PHOSPHINOBORINES; CHEMICAL REACTIONS; SYNTHESIS;) (PHENYL RADICALS; PHOSPHINES; DECABORANES;) (PYROLYSIS; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY;)
OLIN MATHIESON CHEMICAL CORP.; NEW HAVEN, CONN.
AD-274 830 62-3-2 DIV. 4

***BOUNDARY LAYER**

(HYDRODYNAMICS; *DRAG; FRICTION; *REDUCTION; DAMPING; COATINGS; ELASTIC SHELLS; *UNDERWATER PROPULSION; TEST METHODS;) (*BOUNDARY LAYER; FLUID FLOW;)
UNITED STATES RUBBER CO.; WAYNE, N. J.
AD-274 628 62-3-2 DIV. 25

***BRAZING**

(REFRACTORY MATERIALS; *TUNGSTEN; *BRAZING; SILVER SOLDERS;) (SOLDERING ALLOYS; PLATINUM ALLOYS; BORON ALLOYS; POWDER ALLOYS; ADDITIVES; POWDER METALS; FOILS; TITANIUM; ZIRCONIUM; HALIDES; METAL JOINTS; WELDED JOINTS; DIFFUSION; THICKNESS;) (CHEMICAL REACTIONS; TUNGSTEN COMPOUNDS; BORIDES;)
SOLAR AIRCRAFT CO.; SAN DIEGO, CALIF.
AD-274 616 62-3-2 DIV. 17

***BUBBLES**

(*BUBBLES; GASES; SURFACES; LIQUIDS; HEAT TRANSFER; *NUCLEATE BOILING;)
MASSACHUSETTS INST. OF TECH.; DIV. OF SPONSORED RESEARCH; CAMBRIDGE.
AD-274 529 62-3-2 DIV. 20

***CANARD CONFIGURATION**

(*CANARD CONFIGURATION; AIRPLANES; *SPLIT FLAPS; *LEADING EDGE FLAPS; WIND TUNNEL MODELS; AERODYNAMICS; SUBSONIC FLOW; STABILITY (LATERAL); STABILITY (LONGITUDINAL); CONTROL; LIFT; EFFECTIVENESS; MODEL TESTS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 580 62-3-2 DIV. 9

(*CANARD CONFIGURATION; *WING-BODY CONFIGURATIONS; AIRPLANES; SWEPT WINGS; WIND TUNNEL MODELS; STABILITY (LONGITUDINAL); CONTROL; EFFECTIVENESS; MODEL TESTS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 585 62-3-2 DIV. 9

***CAPACITORS**

(METALS; DEFORMATION; *EXPLOSIVE FORMING; UNDERWATER EXPLOSIONS; *ELECTRIC DISCHARGES; *CAPACITORS; SHOCK WAVES; ELECTRICAL EQUIPMENT; CIRCUITS; ENERGY; ANALYSIS; ELECTRIC CURRENTS; ELECTRIC POTENTIAL;) SHEETS; PROCESSING.
REPUBLIC AVIATION CORP.; FARMINGDALE, N. Y.
AD-274 592 62-3-2 DIV. 26

***CARBONIZATION**

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION;) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS;) (*THORIUM COMPOUNDS; OXIDES;) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS;) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS;)
GENERAL ELECTRIC CO.; CINCINNATI, OHIO.
AD-274 654 62-3-2 DIV. 14

***CATALYSIS**

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; THIN FILMS; SINGLE CRYSTALS; *GERMANIUM; SILICON; SURFACES; SURFACE PROPERTIES; PREPARATION; ULTRAVIOLET RADIATION; *CATALYSIS; CHEMICAL REACTIONS; OXIDATION; BENZALDEHYDES TO BENZOIC ACIDS; ELECTRICAL PROPERTIES; IMPEDANCE; ELECTRIC POTENTIAL;) (TEST EQUIPMENT, METERS; RESISTANCE; MEASUREMENT,) *CRYSTAL RECTIFIERS.
RADLEY, J. A.; RESEARCH INST.; CAMDEN, N. J.
AD-274 756 62-3-2 DIV. 8

***CAVITY RESONATORS**

(*WAVEGUIDES; C BAND; K BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS;) (WAVEGUIDE JOINTS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *CAVITY RESONATORS; FREQUENCY SHIFT; TUNING DEVICES; ELECTRIC FIELDS; MAGNETONS; *RADIOFREQUENCY POWER; PRESSURE; GASES; AIR; MEASUREMENT; *MICROWAVES; TEMPERATURE; TEST EQUIPMENT; *HANDBOOKS;)
MICROWAVE ASSOCIATES, INC.; BURLINGTON, MASS.
AD-274 822 62-3-2 DIV. 8

***CELESTIAL MECHANICS**

(*SATELLITE ATTITUDE; YAW; DETECTION BY EJECTION OF SATELLITE VEHICLES FROM *SATELLITE VEHICLES; *CELESTIAL MECHANICS; PERTURBATION THEORY;)
GENERAL DYNAMICS/CONVAIR; SAN DIEGO, CALIF.
AD-274 476 62-3-2 DIV. 12

***CENTRIFUGAL PUMPS**

(*AXIAL FLOW COMPRESSORS; *CENTRIFUGAL PUMPS; *AXIAL FLOW COMPRESSOR BLADES; COMPRESSOR ROTORS; SUBSONIC FLOW; AERODYNAMICS; MATHEMATICAL ANALYSIS; DESIGN;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 573 62-3-2 DIV. 9

***CERAMIC COATINGS**

(*ALLOYS; *METALS; *CERAMIC COATINGS; *CERAMIC MATERIALS; THERMAL RADIATION; REFLECTION; ABSORPTION; BLACKBODY RADIATION; SPECTROGRAPHIC ANALYSIS; SPECTROPHOTOMETERS; SPECTROGRAPHIC DATA; ULTRAVIOLET RADIATION; LIGHT; INFRARED RADIATION; *PHOTOEMISSION;) (CHROMIUM ALLOYS; NICKEL ALLOYS; STEEL; COBALT ALLOYS;) (BERYLLIUM; NIOBIUM; TANTALUM; TITANIUM; TUNGSTEN; VANADIUM; *METAL COATINGS;) (BORON COMPOUNDS; CARBIDES; TANTALUM COMPOUNDS; ZIRCONIUM COMPOUNDS; OXIDES; MOLYBDENUM COMPOUNDS; SILICIDES;) (TUNGSTEN ALLOYS; STAINLESS STEEL; TITANIUM ALLOYS; MOLYBDENUM ALLOYS; IRON ALLOYS;)
NORTHROP CORP.; HAWTHORNE, CALIF.
AD-274 588 62-3-2 DIV. 17

***CERAMIC MATERIALS**

(SOLID STATE PHYSICS; *CERAMIC MATERIALS; RARE EARTH COMPOUNDS; *CERIUM COMPOUNDS; *PRASEODYMIUM COMPOUNDS; LANTHANUM COMPOUNDS; OXIDES; ELECTRICAL PROPERTIES; MEASUREMENT; TRANSIENTS; ELECTRICAL CONDUCTANCE; ELECTRIC CURRENTS; ELECTRIC POTENTIAL; TEMPERATURE (20 TO 600 C);) (MICROBALANCES; FREQUENCY; OXYGEN; TRANSPORT PROPERTIES;)
ARIZONA STATE U.; TEMPE.
AD-274 910 62-3-2 DIV. 29

(*ALLOYS; *METALS; *CERAMIC COATINGS; *CERAMIC MATERIALS; THERMAL RADIATION; REFLECTION; ABSORPTION; BLACKBODY RADIATION; SPECTROGRAPHIC ANALYSIS; SPECTROPHOTOMETERS; SPECTROGRAPHIC DATA; ULTRAVIOLET RADIATION; LIGHT; INFRARED RADIATION; *PHOTOEMISSION;) (CHROMIUM ALLOYS; NICKEL ALLOYS; STEEL; COBALT ALLOYS;) (BERYLLIUM; NIOBIUM; TANTALUM; TITANIUM; TUNGSTEN; VANADIUM; *METAL COATINGS;) (BORON COMPOUNDS; CARBIDES; TANTALUM COMPOUNDS; ZIRCONIUM COMPOUNDS; OXIDES; MOLYBDENUM COMPOUNDS; SILICIDES;) (TUNGSTEN ALLOYS; STAINLESS STEEL; TITANIUM ALLOYS; MOLYBDENUM ALLOYS; IRON ALLOYS;)
NORTHROP CORP.; HAWTHORNE, CALIF.
AD-274 586 62-3-2 DIV. 17

(*BIBLIOGRAPHY; *METALS; *HEAT RESISTANT ALLOYS; *CERAMIC MATERIALS; *REFRACTORY MATERIALS; ALLOYS;) (STEEL; STAINLESS STEEL; IRON ALLOYS; NICKEL ALLOYS; BERYLLIUM; TITANIUM; MAGNESIUM; NIOBIUM; CHROMIUM; MOLYBDENUM; TANTALUM; VANADIUM; TUNGSTEN;)
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO.
AD-274 669 62-3-2 DIV. 17

(CONFERENCES; THERMAL INSULATION; *REFRACTORY MATERIALS; *COMPOSITE MATERIALS;) (*CERAMIC MATERIALS; REFRACTORY COATINGS; CERAMIC COATINGS; METAL COATINGS; COATINGS; CERMETS; GRAPHITE; *METALS; MOLYBDENUM; NIOBIUM; TANTALUM; TUNGSTEN; VANADIUM; VANADIUM ALLOYS; MOLYBDENUM ALLOYS; NIOBIUM ALLOYS; TANTALUM ALLOYS; TUNGSTEN ALLOYS;) (REINFORCING MATERIALS; FIBERS; SINGLE CRYSTALS; CERAMIC FIBERS;) (GUIDED MISSILE NOSES; ROCKET MOTOR NOZZLES; ROCKET NOSES; RE-ENTRY VEHICLES;) ALLOYS; FLAME SPRAYING; PLASMA JETS; ABLATION; DISPERSION HARDENING.
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO.
AD-274 804 62-3-2 DIV. 14

***CERIUM COMPOUNDS**

(SOLID STATE PHYSICS; *CERAMIC MATERIALS; RARE EARTH COMPOUNDS; *CERIUM COMPOUNDS; *PRASEODYMIUM COMPOUNDS; LANTHANUM COMPOUNDS; OXIDES; ELECTRICAL PROPERTIES; MEASUREMENT; TRANSIENTS; ELECTRICAL CONDUCTANCE; ELECTRIC CURRENTS; ELECTRIC POTENTIAL; TEMPERATURE (20 TO 600 C);) (MICROBALANCES; FREQUENCY; OXYGEN; TRANSPORT PROPERTIES;)
ARIZONA STATE U.; TEMPE.
AD-274 910 62-3-2 DIV. 29

***CESIUM**

(*PLASMA PHYSICS; GAS IONIZATION OF *CESIUM; VAPORS BY *SHOCK TUBES;) (MEASUREMENT; TEMPERATURE; PRESSURE; DENSITY; EXPERIMENTAL DATA; CALIBRATION; INSTRUMENTATION; DESIGN; PHOTOGRAPHIC ANALYSIS;) (THERMODYNAMICS AND HYDRODYNAMICS; EQUATIONS;)
PRINCETON U.; N. J.
AD-274 672 62-3-2 DIV. 25

***CHEMICAL BONDS**

(*OXYGEN; *FLUORINE; *CHEMICAL BONDS; THERMOCHEMISTRY;) (NITROGEN COMPOUNDS; *OXYFLUORIDES; FLUORIDES; CHLORINE COMPOUNDS; NITRATES;) (SYNTHESIS; HEAT OF FORMATION; HEAT OF REACTION; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY; FRACTIONATION;) (DESIGN OF COMBUSTION; CALORIMETERS;)
UNITED TECHNOLOGY CORP.; SUNNYVALE, CALIF.
AD-274 698 62-3-2 DIV. 4

***CHLORIDES**

(*HEAT RESISTANT POLYMERS; SULFANURIC *SULFONYL RADICALS; *CHLORIDES; SYNTHESIS BY DECOMPOSITION; PYROLYSIS; CHLORINE COMPOUNDS; PHOSPHORUS COMPOUNDS; AZO RADICALS; SULFONYL RADICALS; CHLORIDES; ISOMER; HETEROCYCLIC COMPOUNDS;) (CHEMICAL REACTIONS; THIONYL CHLORIDES WITH AMMONIUM RADICALS; CHLORIDES; SULFAMYL RADICALS; AMINES;)
ILLINOIS U.; URBANA.
AD-274 681 62-3-2 DIV. 4

***CIRCUITS**

(*CIRCUITS; DESIGN; *TRANSDUCERS; *PROTON ACCELERATORS;) (CESIUM COMPOUNDS; IODIDES; CRYSTALS;) (INSTRUMENTATION; ELECTRON MULTIPLIERS; PHOTOTUBES;) (*SATELLITE VEHICLE RESEARCH; FLIGHT PATHS; FLIGHT TESTING;)
AEROSPACE CORP.; LOS ANGELES, CALIF.
AD-274 702 62-3-2 DIV. 30

***CLAMPS**

(BUCKLING; DEFORMATION; *STRESSES; HYDROSTATIC PRESSURE; LOAD DISTRIBUTION; METAL PLATES; *CLAMPS; ENERGY;) (MATRIX ALGEBRA; INTEGRAL EQUATIONS; DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS);)
BROWN U.; PROVIDENCE, R. I.
AD-274 796 62-3-2 DIV. 25

***CLIMATE**

(CALIFORNIA; FOG; CLOUDS; HAZE; PRECIPITATION; WIND;) (*CLIMATE; PERIODIC VARIATIONS;)
AIR WEATHER SERVICE; SCOTT AIR FORCE BASE, ILL.
AD-274 638 62-3-2 DIV. 2

***CLOUD HEIGHT INDICATORS**

(*CLOUD HEIGHT INDICATORS; METEOROLOGICAL RADAR; *CONVECTION; ERRORS; RADAR ECHO AREAS;) (*RADAR SCANNING; *HEIGHT FINDING; ECHO RANGING;)
FLORIDA STATE U.; TALLAHASSEE.
AD-274 730 62-3-2 DIV. 2

***COATINGS**

(*SOLAR CELLS; MATERIALS; DESIGN; INSTALLATION; FEASIBILITY STUDIES; MODEL TESTS.) (*COATINGS; EPOXY RESINS; SILICONE RESINS.) (PHYSICAL PROPERTIES; STABILIZATION; CLIMATIC FACTORS; VIBRATION; WIND; GUSTS; LOAD DISTRIBUTION.) (ELECTRICAL PROPERTIES; DIODES; STORAGE BATTERIES; RESISTANCE; LIGHT TRANSMISSION.)
HAMILTON STANDARD DIV., UNITED AIRCRAFT CORP., WINDSOR LOCKS, CONN.
AD-274 478 62-3-2 DIV. 8

***COAXIAL CABLES**

(*POWER DIVIDERS; *WAVEGUIDE COUPLERS; *MICROWAVE EQUIPMENT; WAVEGUIDE JOINTS; THEORY; DESIGN.) (*WAVEGUIDES; *COAXIAL CABLES; IMPEDANCE MATCHING; PHASE MEASUREMENT.) ANTENNAS.
MERRIMAC RESEARCH AND DEVELOPMENT, INC., IRVINGTON, N. J.
AD-274 493 62-3-2 DIV. 8

***CODING**

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS, NEW YORK.
AD-274 840 62-3-2 DIV. 5

***COILS**

(*MAGNETIC FIELDS; INTENSITY STUDIES ALONG THE AXIS OF *COILS; *SOLENOIDS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 570 62-3-2 DIV. 25

***COMBAT**

(*COMBAT; *WARFARE; *GAMES THEORY; EQUATIONS; DIGITAL COMPUTERS.) (COMMUNICATION SYSTEMS; MILITARY COMMUNICATIONS; MILITARY INTELLIGENCE; DETERIORATION; SIMULATION; MILITARY OPERATIONS.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 739 62-3-2 DIV. 18

***COMBAT INFORMATION CENTERS**

(GUIDED MISSILES; SURFACE TO AIR; COMMAND SYSTEMS; CONTROL SYSTEMS; *COMBAT INFORMATION CENTERS; RADAR STATIONS; DISPLAY SYSTEMS; GROUND SUPPORT EQUIPMENT; *AIR CONDITIONING EQUIPMENT; AIR; *PARTICULATE FILTERS; EFFECTIVENESS; TESTS.) (AIR CONDITIONING EQUIPMENT; TEMPERATURE; LOW TEMPERATURE RESEARCH; TESTS; *RADAR TRAILERS.)
ORDNANCE MISSION; WHITE SANDS MISSILE RANGE, N. MEX.
AD-274 990 62-3-2 DIV. 13

***COMBINATORIAL ANALYSIS**

(COMMUNICATION SYSTEMS; ANALYSIS; PROBABILITY; *COMBINATORIAL ANALYSIS; *COMPLEX VARIABLES; *SCHEDULING; *MANAGEMENT ENGINEERING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 897 62-3-2 DIV. 5

***COMBUSTION**

(*SOLID ROCKET PROPELLANTS; PROPELLANT GRAINS; *COMBUSTION; FLAMES; PRESSURE; TEMPERATURE; MEASUREMENT; THEORY; TESTS; PHOTOGRAPHIC ANALYSIS; PHOTOGRAPHY.) THERMOCOUPLE PYROMETERS; THERMOCOUPLES; BINDERS; POLYMERS; BUTADIENES; ACRYLIC RESINS; SULFIDES; AMMONIUM RADICALS; PERCHLORATES; HIGH PRESSURE RESEARCH.
PRINCETON U., N. J.
AD-274 591 62-3-2 DIV. 10

(*JET ENGINE FUELS; GAS GENERATOR ENGINES; AIRCRAFT; SUPERSONIC PLANES; IGNITION; *COMBUSTION; FLAMES; EXHAUST GASES; FLUID FLOW; PHYSICAL PROPERTIES; STABILITY; TEST EQUIPMENT; COMBUSTION CHAMBERS; TEST METHODS; INFRARED SPECTROSCOPY.) (HYDROCARBONS; CYCLOHEXANES.)
SHELL OIL CO., WOOD RIVER, ILL.
AD-274 620 62-3-2 DIV. 10

(*SOLID ROCKET PROPELLANTS; *PROPELLANT GRAINS; TEMPERATURE; PRESSURE; *IGNITION; FLAMES; *COMBUSTION; FLAME PROPAGATION; THEORY; TESTS; MATHEMATICAL ANALYSIS; EQUATIONS.) SHOCK TUBES.
UTAH U., SALT LAKE CITY.
AD-274 624 62-3-2 DIV. 10

(*FLUID MECHANICS; GASES; PARTICLES; MIXTURES; *GAS FLOW; GAS IONIZATION; MAGNETOHYDRODYNAMICS; *PLASMA PHYSICS; PLASMA JETS; THERMODYNAMICS; *REACTION KINETICS; KINETIC THEORY; CHEMICAL REACTIONS; SURFACES; CATALYSIS.) (ALUMINUM; SOLID ROCKET PROPELLANTS; *COMBUSTION; FLARES.) *JET PROPULSION; RECOMBINATION REACTIONS.
JAMES FORRESTAL RESEARCH CENTER, PRINCETON U., N. J.
AD-274 748 62-3-2 DIV. 9

***COMBUSTION CHAMBER GASES**

(BLUNT BODIES; *AIRFOILS; CONICAL BODIES; HEAT TRANSFER; HYPERSONICS.) (*GAS FLOW; *COMBUSTION CHAMBER GASES; PRESSURE; WATER VAPOR; CONDENSATION.)
ROSEMOUNT AERONAUTICAL LABS., U. OF MINN., MINNEAPOLIS.
AD-274 792 62-3-2 DIV. 25

***COMMAND SYSTEMS**

(RADAR BEACONS; *RADAR RECEIVERS; AIRBORNE USING RADAR SIGNALS FROM RADAR TRACKING; *COMMAND SYSTEMS AS CONTROL SYSTEMS FOR RADAR JAMMING; RADAR TRANSMITTERS DURING TESTS OF ANTIAIRCRAFT DEFENSE SYSTEMS.) (FEASIBILITY STUDIES OF USING RADAR RECEIVERS, RADAR BEACONS FROM GUIDED MISSILES, SURFACE TO AIR, COMMAND SYSTEMS IN RADAR JAMMING, AIRCRAFT.)
ARMY AIR DEFENSE BOARD, FORT BLISS, TEX.
AD-274 708 62-3-2 DIV. 6

***COMMUNICATION SYSTEMS**

(*STATISTICAL PROCESSES OF TIME, *SIGNALS IN A *COMMUNICATIONS SYSTEM.) (CORRELATION TECHNIQUES OF LINEAR SYSTEMS AND NONLINEAR SYSTEMS; COMPUTERS; PROGRAMMING; ERRORS.) (WAVE TRANSMISSION; VECTOR ANALYSIS; INTEGRAL EQUATIONS; OPERATORS (MATHEMATICS); MATRIX ALGEBRA; INTEGRAL TRANSFORMS; SEQUENCES.) (DATA TRANSMISSION SYSTEMS; COMMUNICATIONS THEORY; RADIO SIGNALS; WAVE ANALYSIS.)
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 492 62-3-2 DIV. 8

(*COMMUNICATION SYSTEMS; TESTS; *STANDARDS; DESIGN; THEORY; TEST METHODS.) (*WAVE TRANSMISSION; RADIO WAVES; SCATTERING BY IONOSPHERE; ATMOSPHERE AND METEORS; VERY LOW FREQUENCY; IONOSPHERIC PROPAGATION; TRANSMISSION LINES; RADIOFREQUENCY CABLES; SATELLITE VEHICLES; RADIO TRANSMISSION; MICROWAVE RELAY SYSTEMS; RADIO RELAY SYSTEMS.) (*RADIO COMMUNICATION SYSTEMS; *MICROWAVE COMMUNICATION SYSTEMS; COMMUNICATION EQUIPMENT; COSTS; MATHEMATICAL ANALYSIS; SPECIFICATIONS.) RELIABILITY.
MINNEAPOLIS-HONEYWELL REGULATOR CO., SEATTLE, WASH.
AD-274 945 62-3-2 DIV. 5

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***COMMUNICATIONS THEORY**

(*COMMUNICATIONS THEORY; *RADIO SIGNALS; *RADIO WAVES; WAVE TRANSMISSION; HIGH FREQUENCY; ATTENUATION; PROPAGATION; IONOSPHERE MODELS; ANALYSIS; THEORY.) (ELECTROMAGNETIC WAVES; POLARIZATION; PLASMA PHYSICS; *MAGNETO-OPTIC ROTATION; PHASE SHIFTERS; *IONOSPHERIC PROPAGATION; MEASUREMENT; TEST EQUIPMENT; TEST METHODS.)
PAGE COMMUNICATIONS ENGINEERS, INC., WASHINGTON, D. C.
AD-274 682 62-3-2 DIV. 8

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***COMPLEX VARIABLES**

(COMMUNICATION SYSTEMS; ANALYSIS; PROBABILITY; *COMBINATORIAL ANALYSIS; *COMPLEX VARIABLES; *SCHEDULING; *MANAGEMENT ENGINEERING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 597 62-3-2 DIV. 5

***COMPRESSIBLE FLOW**

(*COMPRESSIBLE FLOW; FLUIDS; *NOZZLES; MAGNETOHYDRODYNAMICS.) (GAS FLOW; ACCELERATION; DECELERATION; THRUST; VELOCITY; PRESSURE; TEMPERATURE.) (PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS.)
DOUGLAS AIRCRAFT CO., INC., SANTA MONICA, CALIF.
AD-274 803 62-3-2 DIV. 9

***COMPUTER LOGIC**

(*NUMERICAL METHODS AND PROCEDURES; STATISTICAL ANALYSIS; *PROBABILITY.) (COMPUTERS; *COMPUTER LOGIC; CODING.) (*NEUTRON SCATTERING; LATTICES; RESONANCE; ABSORPTION; ENERGY.) (NEUTRON CROSS SECTIONS FOR TUNGSTEN AND GOLD.) (RESEARCH REACTORS MODIFIED BY WATER; BERYLLIUM COMPOUNDS; OXIDES; LITHIUM COMPOUNDS; HYDRIDES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 572 62-3-2 DIV. 20

***COMPUTERS**

(*DATA STORAGE SYSTEMS; DIGITAL COMPUTERS; *PUNCHED CARD METHODS; SEQUENCES; CODING; *PROGRAMMING; FACTOR ANALYSIS; TRANSFORMATIONS (MATHEMATICS).) (*COMPUTERS; COMPUTER LOGIC; MAGNETIC TAPE.) (TESTS; ANALYSIS.)
WASHINGTON U., SEATTLE.
AD-274 634 62-3-2 DIV. 30

(*COMPUTERS; *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS; SERIES.) (THEORY AND STRUCTURES OF *DATA PROCESSING SYSTEMS; *DATA STORAGE SYSTEMS.) (ERRORS; NUMERICAL ANALYSIS; SEQUENCES.)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***CONDENSATION**

(SOLIDS; *PARTICLES; DETECTION BY LIGHT; SCATTERING; INTENSITY; PHOTOEMISSION; REFRACTIVE INDEX; *OPTICAL ANALYSIS.) (*GASES; *CONDENSATION; SHOCK TUBES; MEASUREMENT.) (FEASIBILITY STUDIES; THEORY.)
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 515 62-3-2 DIV. 25

***CONICAL BODIES**

(MODEL TESTS; MATHEMATICAL ANALYSIS OF FLUTTER AND PITCH OF WIND TUNNEL MODELS *CONICAL BODIES ON SPRINGS.) (AERODYNAMICS; BODIES OF REVOLUTION; BOUNDARY LAYER; SHOCK WAVES; DOWNWASH; SUPERSONICS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 569 62-3-2 DIV. 1

(*CONICAL BODIES; BODIES OF REVOLUTION; CYLINDRICAL BODIES; WIND TUNNEL MODELS; HYPERSONICS; LAMINAR BOUNDARY LAYER; TURBULENT FLOW; BOUNDARY LAYER; TURBULENCE; SEPARATION; *HEAT TRANSFER; PRESSURE; LOAD DISTRIBUTION; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 584 62-3-2 DIV. 9

***CONVECTION**

(*CLOUD HEIGHT INDICATORS; METEOROLOGICAL RADAR; *CONVECTION; ERRORS; RADAR ECHO AREAS.) (RADAR SCANNING; *HEIGHT FINDING; ECHO RANGING.)
FLORIDA STATE U., TALLAHASSEE.
AD-274 730 62-3-2 DIV. 2

(*CONVECTION; PERTURBATION THEORY; NON-LINEAR DIFFERENTIAL EQUATIONS; PERIODIC VARIATIONS.) (*THERMAL CONDUCTIVITY; STABILITY; MATHEMATICAL ANALYSIS; TEMPERATURE; VISCOSITY.)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 779 62-3-2 DIV. 15

***CORRECTIONS**

(*THRUST; CONTROL SYSTEMS; GUIDANCE; *ORBITAL FLIGHT PATHS; GUIDED MISSILE TRAJECTORIES; ANALYSIS OF VARIANCE.) (COMPLEX VARIABLES; ERRORS; *CORRECTIONS.)
POLYTECHNIC INST. OF BROOKLYN, N. Y.
AD-274 749 62-3-2 DIV. 29

***CORROSION**

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

***CORROSION RESEARCH**

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

***CORROSION-RESISTANT ALLOYS**

(*STAINLESS STEEL, *HEAT RESISTANT ALLOYS, *CORROSION RESISTANT ALLOYS, AUSTENITE, MARTENSITE, DISPERSION HARDENING, HEAT TREATMENT, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, DATA.) (DEFORMATION, PHASE TRANSITIONS, COOLING, AGING.)
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO
AD-274 809 62-3-2 DIV. 17

***CORUNDUM**

(*BIBLIOGRAPHY, *CRYSTALS, GROWTH, PREPARATION, LASERS.) (*GARNET, *RUBY, *CORUNDUM, *SPINELS, SAPPHIRES, FERRITES, METALLIC COMPOUNDS, ALUMINUM COMPOUNDS, OXIDES, REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE, SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 642 62-3-2 DIV. 14

***COUPLING CIRCUITS**

(*PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, BROADBAND, NARROWBAND, X BAND, K BAND, ELECTRONIC CIRCUITS, FEASIBILITY STUDIES, DESIGN, THEORY.) (*COUPLING CIRCUITS, CYCLOTRONS, WAVE TRANSMISSION, PROPAGATION, HELIXES, IMPEDANCE, ELECTRON GUNS, MAGNETIC FIELDS, SPACE CHARGES, *ELECTRON BEAMS, TESTS.)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 845 62-3-2 DIV. 8

***CRYOGENICS**

(GASES, CONDENSATION, *CRYOGENICS, GAS PUMPS, *VACUUM SYSTEMS.) (LIQUEFIED GASES, NITROGEN.) IONIZATION GAGES.
CRYOVAC, INC., COLUMBUS, OHIO.
AD-274 650 62-3-2 DIV. 9

***CRYSTAL RECTIFIERS**

(*SEMICONDUCTORS, *SEMICONDUCTING FILMS, THIN FILMS, SINGLE CRYSTALS, *GERMANIUM, SILICON, SURFACES, SURFACE PROPERTIES, PREPARATION, ULTRAVIOLET RADIATION, *CATALYSIS, CHEMICAL REACTIONS, OXIDATION, BENZALDEHYDES TO BENZOIC ACIDS, ELECTRICAL PROPERTIES, IMPEDANCE, ELECTRIC POTENTIAL.) (TEST EQUIPMENT, METERS, RESISTANCE MEASUREMENT,) *CRYSTAL RECTIFIERS.
RADLEY, J. A., RESEARCH INST., CAMDEN, N. J.
AD-274 736 62-3-2 DIV. 8

***CRYSTAL STRUCTURE**

(ALLOYS, METALS, *CRYSTAL STRUCTURE, LATTICES, DEFORMATION, X-RAY DIFFRACTION ANALYSIS, *TANTALUM, *NIOBIUM, *MARTENSITE, STAINLESS STEEL (16 CR-12 NI),)
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 840 62-3-2 DIV. 17

***CRYSTALLIZATION**

(*SINGLE CRYSTALS, *CRYSTALS, MICA, THIN FILMS, GROWTH, *CRYSTALLIZATION, ZONE MELTING, MANUFACTURING METHODS, CRYSTAL OVENS, LABORATORY EQUIPMENT, *BIBLIOGRAPHY,) (PRODUCTION, SHEETS, SOLIDS, SOLUTIONS, *POTASSIUM COMPOUNDS, ALUMINUM COMPOUNDS, *RUBIDIUM COMPOUNDS, BORON COMPOUNDS, *FLUORIDES, *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***CRYSTALS**

(*BIBLIOGRAPHY, *CRYSTALS, GROWTH, PREPARATION, LASERS.) (*GARNET, *RUBY, *CORUNDUM, *SPINELS, SAPPHIRES, FERRITES, METALLIC COMPOUNDS, ALUMINUM COMPOUNDS, OXIDES, REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE, SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 642 62-3-2 DIV. 14

(*PHOTOEMISSION, SODIUM, GERMANIUM, SILICON, *CRYSTALS, WORK FUNCTIONS, TESTS.) (SEMICONDUCTORS, SPACE CHARGES, IONIC CURRENT, ADSORPTION, *PHOTOELECTRONS, ELECTRONS, SURFACE PROPERTIES, MEASUREMENT,) (THIN FILMS, SODIUM COMPOUNDS, ANTIMONIDES, PROCESSING.)
PHYSICAL ELECTRONICS RESEARCH LAB., INSTITUTE OF TECH., U. OF MINN., MINNEAPOLIS.
AD-274 718 62-3-2 DIV. 25

(*SINGLE CRYSTALS, *CRYSTALS, MICA, THIN FILMS, GROWTH, *CRYSTALLIZATION, ZONE MELTING, MANUFACTURING METHODS, CRYSTAL OVENS, LABORATORY EQUIPMENT, *BIBLIOGRAPHY,) (PRODUCTION, SHEETS, SOLIDS, SOLUTIONS, *POTASSIUM COMPOUNDS, ALUMINUM COMPOUNDS, *RUBIDIUM COMPOUNDS, BORON COMPOUNDS, *FLUORIDES, *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***CYBERNETICS**

(DATA PROCESSING SYSTEMS, *CYBERNETICS, AUTOMATION, COMPUTERS,) (MATHEMATICAL PREDICTION, *MATRIX ALGEBRA, COMPLEX VARIABLES, INTEGRAL EQUATIONS,)
SYSTEMS RESEARCH CENTER, CASE INST. OF TECH., CLEVELAND, OHIO.
AD-274 802 62-3-2 DIV. 30

***CYLINDRICAL BODIES**

(*CYLINDRICAL BODIES, BODIES OF REVOLUTION, *WING-BODY CONFIGURATIONS, SWEPT WINGS, WIND TUNNEL MODELS, SUPERSONICS, HYPERSONICS, *AERODYNAMIC HEATING, *HEAT TRANSFER, MODEL TESTS,)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 583 62-3-2 DIV. 9

***DATA PROCESSING SYSTEMS**

(*VOICE COMMUNICATION SYSTEMS, *DIGITAL SYSTEMS, DATA STORAGE SYSTEMS, *SPEECH TRANSMISSION, CODING, INTELLIGIBILITY, AUDIOFREQUENCY, SIDEBANDS, DESIGN, TESTS,) (TRANSISTOR AMPLIFIERS, BAND-SELECTIVE AMPLIFIERS, BAND-PASS AMPLIFIERS, BAND-PASS FILTERS, ACOUSTIC FILTERS, TIMING CIRCUITS,) (PULSE GENERATORS, *PULSE MODULATION, PULSE TRANSMITTERS, CRYSTAL OSCILLATORS, *DATA PROCESSING SYSTEMS, *ANALOG-TO-DIGITAL CONVERTERS,)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS
AD-274 466 62-3-2 DIV. 5

(*RESEARCH PROGRAM ADMINISTRATION, HANDBOOKS, *OPERATIONS RESEARCH, MONITORS,) (COMPUTERS, *DATA PROCESSING SYSTEMS,)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 506 62-3-2 DIV. 30

(*DATA PROCESSING SYSTEMS, DATA TRANSMISSION SYSTEMS, DIGITAL COMPUTERS, AIR FORCE OPERATIONS,)
THOMPSON RAMO WOOLDRIDGE, INC., CANOGA PARK, CALIF.
AD-274 550 62-3-2 DIV. 30

(*COMPUTERS, *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS, SERIES,) (THEORY AND STRUCTURES OF *DATA PROCESSING SYSTEMS, *DATA STORAGE SYSTEMS,) (ERRORS, NUMERICAL ANALYSIS, SEQUENCES,)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***DATA STORAGE SYSTEMS**

(*DATA STORAGE SYSTEMS, DIGITAL COMPUTERS, *PUNCHED CARD METHODS, SEQUENCES, CODING, *PROGRAMMING, FACTOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS),) (*COMPUTERS, COMPUTER LOGIC, MAGNETIC TAPE,) (TESTS, ANALYSIS,)
WASHINGTON U., SEATTLE.
AD-274 634 62-3-2 DIV. 30

(*COMPUTERS, *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS, SERIES,) (THEORY AND STRUCTURES OF *DATA PROCESSING SYSTEMS, *DATA STORAGE SYSTEMS,) (ERRORS, NUMERICAL ANALYSIS, SEQUENCES,)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***DATA TRANSMISSION SYSTEMS**

(*DATA TRANSMISSION SYSTEMS, COMMUNICATION SYSTEMS, COMMUNICATIONS THEORY, INFORMATION RETRIEVAL,) (COMPUTER LOGIC, *DETECTION, RELIABILITY, PROBABILITY,)
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 472 62-3-2 DIV. 25

(CODING AND *SWITCHING CIRCUITS FOR AUTOMATIC, *ERRORS, CORRECTIONS WITHIN *DIGITAL SYSTEMS,) (COMMUNICATION SYSTEMS, COMPUTER LOGIC,) (*DATA TRANSMISSION SYSTEMS, ELECTRICAL NETWORKS, DETECTION,) MATRIX ALGEBRA, *DIGITAL COMPUTERS,
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 689 62-3-2 DIV. 30

***DECABORANES**

(IONS, *DECABORANES, BORON COMPOUNDS, CHEMICAL BONDS, ISOTOPES, *IONIZATION POTENTIAL, MEASUREMENT, MASS SPECTROSCOPY,)
RIAS, INC., BALTIMORE, MD.
AD-274 603 62-3-2 DIV. 4

(*SHIELDING, *REACTOR SHIELDING MATERIALS, NEUTRONS BY *ELASTOMERS, ORGANOBORANES, POLYMERS, DIENES, ALKYL RADICALS, *DECABORANES, STABILITY, CASTING, HYDROGEN, DENSITY, AGING,)
ROCK ISLAND ARSENAL LAB., ILL.
AD-274 683 62-3-2 DIV. 20

***DEFORMATION**

(*ACOUSTICS, *DEFORMATION, *SINGLE CRYSTALS (METALLURGY), ALUMINUM, MEASUREMENT, WAVE TRANSMISSION, STRESSES,)
LESSELLS AND ASSOCIATES, INC., BOSTON, MASS.
AD-274 484 62-3-2 DIV. 17

***DETECTION**

(MATHEMATICAL PREDICTION FOR *DETECTION OF *SONAR SIGNALS, SIGNAL-TO-NOISE RATIO, UNDERWATER SOUND SIGNAL,) (*SONAR, SONAR EQUIPMENT, SONAR RECEIVERS, DESIGN,) (UNDERWATER SOUND, UNDERWATER SOUND TRANSMISSION, *UNDERWATER SOUND SIGNAL, DETECTION,)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 500 62-3-2 DIV. 6

***DETECTORS**

(*DETECTORS, SYNCHRONIZERS, TRANSISTORS,)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 692 62-3-2 DIV. 8

***DETONATION**

(*FIRE, *DETONATION, *PROPULSION, *PROPELLANTS, GAS DISCHARGES, SATELLITE VEHICLE RESEARCH,) (INSTRUMENTATION, PHOTOMULTIPLIERS, *SCHLIEREN PHOTOGRAPHY, SPECTROGRAPHIC CAMERAS,) (FEASIBILITY STUDIES, TESTS,)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 643 62-3-2 DIV. 25

***DIGITAL COMPUTERS**

(MATHEMATICAL PREDICTION, PROBABILITY, RELIABILITY, *NUCLEAR POWER PLANTS, GENERATORS,) (*DIGITAL COMPUTERS, COMPUTER LOGIC, PROGRAMMING,)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 485 62-3-2 DIV. 20

(DIFFERENTIAL EQUATIONS, INTEGRATION, *DIGITAL COMPUTERS, *PROGRAMMING,)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 538 62-3-2 DIV. 30

(CODING AND *SWITCHING CIRCUITS FOR AUTOMATIC, *ERRORS, CORRECTIONS WITHIN *DIGITAL SYSTEMS,) (COMMUNICATION SYSTEMS, COMPUTER LOGIC,) (*DATA TRANSMISSION SYSTEMS, ELECTRICAL NETWORKS, DETECTION,) MATRIX ALGEBRA, *DIGITAL COMPUTERS,
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 689 62-3-2 DIV. 30

***DIGITAL SYSTEMS**

(*VOICE COMMUNICATION SYSTEMS, *DIGITAL SYSTEMS, DATA STORAGE SYSTEMS, *SPEECH TRANSMISSION, CODING, INTELLIGIBILITY, AUDIOFREQUENCY, SIDEBANDS, DESIGN, TESTS,) (TRANSISTOR AMPLIFIERS, BAND-SELECTIVE AMPLIFIERS, BAND-PASS AMPLIFIERS, BAND-PASS FILTERS, ACOUSTIC FILTERS, TIMING CIRCUITS,) (PULSE GENERATORS, *PULSE MODULATION, PULSE TRANSMITTERS, CRYSTAL OSCILLATORS, *DATA PROCESSING SYSTEMS, *ANALOG-TO-DIGITAL CONVERTERS,)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
AD-274 466 62-3-2 DIV. 5

(CODING AND *SWITCHING CIRCUITS FOR AUTOMATIC, *ERRORS, CORRECTIONS WITHIN *DIGITAL SYSTEMS,) (COMMUNICATION SYSTEMS, COMPUTER LOGIC,) (*DATA TRANSMISSION SYSTEMS, ELECTRICAL NETWORKS, DETECTION,) MATRIX ALGEBRA, *DIGITAL COMPUTERS,
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 689 62-3-2 DIV. 30

***DIODES**

(*DIODES, TRANSISTORS, *SEMICONDUCTORS, DESIGN, *MANUFACTURING METHODS,) (CRYSTALS, *SINGLE CRYSTALS, LATTICES, GROWTH, THIN FILMS, SILICON, DEPOSITS, THICKNESS,) (CHEMICAL IMPURITIES, CONTROL, DETERMINATION, DIFFUSION,) (THIN FILMS, MEASUREMENT BY INFRARED SPECTROSCOPY,)
SYLVANIA ELECTRIC PRODUCTS, INC., *OSBURN, MASS.
AD-274 621 62-3-2 DIV. 8

***DISCHARGE TUBES**

(*GLOW DISCHARGES, *DISCHARGE TUBES, *IMPEDANCE, *IONIC CURRENT, TESTS, MEASUREMENT, MATHEMATICAL ANALYSIS,) (ARGON, ELECTRON TUBES, CATHODES (ELECTRON TUBES), IMPEDANCE BRIDGES, IONS, TEST EQUIPMENT,)
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
AD-274 476 62-3-2 DIV. 8

(*MAGNETOHYDRODYNAMICS, MAGNETIC PINCH IN *DISCHARGE TUBES, PLASMA OSCILLATIONS,) (MEASUREMENT OF TURBULENCE IN MAGNETIC FIELDS BY OSCILLOSCOPE PROBES,) (INSTRUMENTATION, PHOTOGRAPHIC ANALYSIS, OSCILLOSCOPES, PHOTOGRAPHS,)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 699 62-3-2 DIV. 25

***DISPLAY SYSTEMS**

(*DISPLAY SYSTEMS, SOLID STATE PHYSICS, LUMINESCENCE, *LUMINESCENT MATERIALS.) (*ELECTRONIC SWITCHES, PLATINUM, PALLADIUM, IONIC CURRENT, LIFE EXPECTANCY, ELECTROSTRICTION, SWITCHES.) (RESISTORS, *FERROELECTRIC MATERIALS, SUPPRESSORS.) (SANDWICH CONSTRUCTION, LAMINATES.)
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
AD-274 630 62-3-2 DIV. 8

***DISSOCIATION**

(*REACTION KINETICS, *DISSOCIATION, *RECOMBINATION REACTIONS, *GASES, IONS, MOLECULES DURING *IONIZATION, MOLECULAR ROTATION, VIBRATION, RELAXATION TIME AT HIGH TEMPERATURE RESEARCH, ENERGY TRANSFER EXCITATION, ATOMIC ENERGY LEVELS, THEORY.)
SHOCK WAVES, ATMOSPHERE ENTRY.
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 467 62-3-2 DIV. 4

(*HYDRODYNAMICS, STABILITY IN *DISSOCIATION OF *GASES.) (HYPERSONICS, GAS FLOW AND VORTICES, SHEETS, BLUNT BODIES, CONICAL BODIES, *EDGES, CYLINDRICAL BODIES.)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 782 62-3-2 DIV. 9

***DRAG**

(HYDRODYNAMICS, *DRAG, FRICTION, *REDUCTION, DAMPING, COATINGS, ELASTIC SHELLS, *UNDERWATER PROPULSION, TEST METHODS.) (*BOUNDARY LAYER, FLUID FLOW.)
UNITED STATES RUBBER CO., WAYNE, N. J.
AD-274 628 62-3-2 DIV. 25

***DUCTED FANS**

(*DUCTED FANS IN WINGS, SEMISPAN MODELS, *WIND TUNNEL MODELS, AERODYNAMICS, MOMENTS, MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 889 62-3-2 DIV. 9

***DYNAMICS**

(*DYNAMICS, NONLINEAR SYSTEMS, THEORY OF *ELECTROMAGNETIC WAVES, PROPAGATION IN IONIZATION (IONIZED MEDIA).) (*RADIO WAVES, REFLECTION.) (ELECTRONS, DENSITY.) (*PLASMA PHYSICS, RESONANCE, PLASMA OSCILLATIONS, DIFFERENTIAL EQUATIONS, SPACE CHARGES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 726 62-3-2 DIV. 25

***DYSPROSIUM**

(*DYSPROSIUM, IRON COMPOUNDS, *GARNET, *HYPERFINE STRUCTURE, QUADRUPOLE MOMENTS, ELECTRON TRANSITIONS, QUANTUM MECHANICS, NUCLEAR STATES, NUCLEAR SPINS, NUCLEAR RESONANCE, NUCLEAR MAGNETIC MOMENTS, EXCITATION, LOW TEMPERATURE RESEARCH.) (SPECTROGRAPHIC ANALYSIS, GAMMA RAYS, ABSORPTION.)
ISOTOPES.
HEBREW U. (ISRAEL).
AD-274 853 62-3-2 DIV. 25

***ELASTICITY**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY, THEORY OF *SOLIDS.) (*MECHANICS, SHEAR STRESSES, LOAD DISTRIBUTION, DEFORMATION, DYNAMICS, POTENTIAL THEORY, KINETIC THEORY.) (*SOLID STATE PHYSICS, CRYSTALS, METALLIC CRYSTALS.)
LABORATORY FOR INSULATION RESEARCH, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

(CYLINDRICAL BODIES, *STRUCTURAL SHELLS, VIBRATION.) (WAVE TRANSMISSION, *ELASTICITY.) DEFORMATION.
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 696 62-3-2 DIV. 25

(MECHANICAL ENGINEERING, *ROTATING STRUCTURES, RODS, *VIBRATION, *ELASTICITY, NONLINEAR SYSTEMS.) (ENERGY, DAMPING, RODS.)
USSR.
MINNESOTA U., MINNEAPOLIS.
AD-274 743 62-3-2 DIV. 25

(*RODS, *ELASTICITY, *STABILITY, MECHANICAL PROPERTIES, STRESSES, DEFORMATION, THEORY, BEAMS, MATHEMATICAL ANALYSIS.) MECHANICS, APPLIED MECHANICS.
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 753 62-3-2 DIV. 25

(FREE SURFACES OF *ELASTICITY, *SOLIDS AT SUPERSONICS, VELOCITY, VIBRATION, *STRESSES, *SHEAR STRESSES, LOADING, LOAD DISTRIBUTION.) (*PARTIAL DIFFERENTIAL EQUATIONS, TIME.)
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
AD-274 849 62-3-2 DIV. 25

***ELASTOMERS**

(*HEAT RESISTANT POLYMERS, *ELASTOMERS, *SILICON COMPOUNDS, *NITROGEN COMPOUNDS, SYNTHESIS.) (POLYMERS, CHLORINE COMPOUNDS, METHYL RADICALS, PHENYL RADICALS, SILANES, AZO RADICALS, CYCLOPENTANES, CYCLOHEXANES, PROPYL RADICALS, AMINES.) (POLYMERIZATION, MOLECULAR STRUCTURE, VISCOSITY, MOLECULAR WEIGHT.) INFRARED SPECTROSCOPY, CHEMICAL ANALYSIS.
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 489 62-3-2 DIV. 4

(*POLYMERS, *ELASTOMERS, *SILICON COMPOUNDS, *NITROGEN COMPOUNDS, *AMINES, AZO RADICALS, SYNTHESIS, *POLYMERIZATION, CHEMICAL REACTIONS.) (STABILITY, TEMPERATURE, HYDROLYSIS.) (METHYL RADICALS, SILICONES, HETEROCYCLIC COMPOUNDS, ETHYL RADICALS, PHENYL RADICALS, OXYGEN COMPOUNDS, VINYL RADICALS, CHLORIDES.)
MALLINCKRODT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 520 62-3-2 DIV. 4

(*SHIELDING, *REACTOR SHIELDING MATERIALS, NEUTRONS BY *ELASTOMERS, ORGANOBORANES, POLYMERS, DIENES, ALKYL RADICALS, *DECABORANES, STABILITY, CASTING, HYDROGEN, DENSITY, AGING.)
ROCK ISLAND ARSENAL LAB., ILL.
AD-274 685 62-3-2 DIV. 20

***ELECTRIC DISCHARGES**

(METALS, DEFORMATION, *EXPLOSIVE FORMING, UNDERWATER EXPLOSIONS, *ELECTRIC DISCHARGES, *CAPACITORS, SHOCK WAVES, ELECTRICAL EQUIPMENT, CIRCUITS, ENERGY, ANALYSIS, ELECTRIC CURRENTS, ELECTRIC POTENTIAL.) SHEETS, PROCESSING.
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 592 62-3-2 DIV. 26

***ELECTRIC POWER PRODUCTION**

(*ELECTRIC POWER PRODUCTION, GENERATORS, *ELECTRIC PROPULSION, *THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM ELECTRON TUBES, CATHODES (ELECTRON TUBES), DESIGN, SEALS, MATERIALS, CERAMIC MATERIALS, LABORATORY EQUIPMENT, SPECTROGRAPHIC ANALYSIS, ELECTRIC INSULATION, HIGH TEMPERATURE RESEARCH, LOW PRESSURE RESEARCH.) (CESIUM, GAS IONIZATION, VAPORS, THERMODYNAMICS, TRANSPORT PROPERTIES.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 696 62-3-2 DIV. 25

(*SOLAR CELLS, PHOTOELECTRIC CELLS, THIN FILMS, MATERIALS, RADIATION DAMAGE.) (SINGLE CRYSTALS, CADMIUM COMPOUNDS, SULFIDES, RELIABILITY, ADHESIVES, COATINGS, AIRBORNE, PLASTICS.) (*ELECTRIC POWER PRODUCTION, POWER SUPPLIES.)
RCA DEFENSE ELECTRONIC PRODUCTS, PRINCETON, N. J.
AD-274 841 62-3-2 DIV. 7

***ELECTRIC PROPULSION**

(*ELECTRIC POWER PRODUCTION, GENERATORS, *ELECTRIC PROPULSION, *THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM ELECTRON TUBES, CATHODES (ELECTRON TUBES), DESIGN, SEALS, MATERIALS, CERAMIC MATERIALS, LABORATORY EQUIPMENT, SPECTROGRAPHIC ANALYSIS, ELECTRIC INSULATION, HIGH TEMPERATURE RESEARCH, LOW PRESSURE RESEARCH.) (CESIUM, GAS IONIZATION, VAPORS, THERMODYNAMICS, TRANSPORT PROPERTIES.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 696 62-3-2 DIV. 25

***ELECTRICAL CONDUCTANCE**

(*ELECTRICAL CONDUCTANCE, VELOCITY, MEASUREMENT BY *TRANSDUCERS.) (PLASMA OSCILLATIONS, ELECTROMAGNETIC WAVES, GAS IONIZATION, PROPAGATION, SCATTERING, BOUNDARY LAYER, SHOCK WAVES.) (*RE-ENTRY VEHICLES, SATELLITE VEHICLE RESEARCH.) (TESTS AND ANALYSIS, MATHEMATICAL ANALYSIS.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 701 62-3-2 DIV. 25

***ELECTRODES**

(POWER SUPPLIES, *FUEL CELLS, ELECTROLYTIC CELLS, DESIGN, *HYDROGEN, *OXYGEN, THEORY, *ELECTRODES, GRAPHITE, TEST METHODS.)
NEW YORK STATE COLL. OF CERAMICS, ALFRED U.
AD-274 618 62-3-2 DIV. 7

***ELECTROLYTIC CAPACITORS**

(*ELECTROLYTIC CAPACITORS, *TANTALUM CAPACITORS, DESIGN, *MANUFACTURING METHODS, ANODES (ELECTROLYTIC CELL), SINTERING.) (SURFACE PROPERTIES, MANGANESE COMPOUNDS, OXIDES, DIOXIDES, CHEMICAL IMPURITIES, PROCESSING, TESTS.) (ANODES (ELECTROLYTIC CELL), TANTALUM, FOAMED METALS, ELECTRICAL PROPERTIES, CHEMICAL ANALYSIS.)
GENERAL ELECTRIC CO., IRMO, SOUTH CAROLINA.
AD-274 733 62-3-2 DIV. 8

***ELECTROMAGNETIC EFFECTS**

(*PLASMA PHYSICS, PARTICLES, *ELECTROMAGNETIC EFFECTS, DIFFUSION, *TRANSPORT PROPERTIES.) (PHYSICAL PROPERTIES, DENSITY, ENERGY, TEMPERATURE.)
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER, LOS ANGELES.
AD-274 627 62-3-2 DIV. 25

***ELECTROMAGNETIC FIELDS**

(*NUCLEAR PHYSICS, *ELECTROMAGNETIC FIELDS, *NUCLEAR ENERGY LEVELS, *NUCLEI, EXCITATION, *GAMMA RAYS, THEORY, PROBABILITY OF NUCLEAR MODELS.) (ELECTRONS, PHOTONS, ISOTOPES, RADIOACTIVITY.) (OXYGEN, CALCIUM, ZIRCONIUM, FLUORINE, STRONTIUM.)
STRASBOURG U. (FRANCE).
AD-274 780 62-3-2 DIV. 20

***ELECTROMAGNETIC WAVE REFLECTIONS**

(*RADAR SIGNALS, RADAR PULSES, SCATTERING, *ATTENUATION, IONOSPHERIC PROPAGATION, *IONOSPHERE, TEMPERATURE, WAVE TRANSMISSION, *ELECTROMAGNETIC WAVE REFLECTIONS, INTEGRAL TRANSFORMS, SPECTROGRAPHIC ANALYSIS.)
CORNELL U., ITHACA, N. Y.
AD-274 721 62-3-2 DIV. 8

(*SCATTERING, *ELECTROMAGNETIC WAVE REFLECTIONS, SURFACES, CYLINDRICAL BODIES.) (ELECTROMAGNETIC WAVES, BOUNDARY LAYER, ELECTRONS, PHYSICS.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 725 62-3-2 DIV. 25

***ELECTROMAGNETIC WAVES**

(*SCATTERING, *ELECTROMAGNETIC WAVES, *TARGETS, *LOW FREQUENCY.) (QUANTUM MECHANICS, PARTIAL DIFFERENTIAL EQUATIONS, POLYNOMIALS, METAMATHEMATICS, NONLINEAR SYSTEMS.)
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 528 62-3-2 DIV. 25

(*ELECTROMAGNETIC WAVES, *SCATTERING, PLASMA PHYSICS, GAS IONIZATION.) (SURFACE TO SURFACE, GUIDED MISSILES, INTERCEPTION, INTERCEPTION PROBABILITIES, RE-ENTRY VEHICLES.) (ELECTRON BEAMS, RE-ENTRY AERODYNAMICS, IONIZATION, SHOCK TUBES, ELECTRIC DISCHARGES.) MAGNETOHYDRODYNAMICS, ANTIAIRCRAFT DEFENSE SYSTEMS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 610 62-3-2 DIV. 18

(*ELECTROMAGNETIC WAVES, *ELECTRON BEAMS.) (PLASMA OSCILLATIONS, RESONANCE SCATTERING, CYLINDRICAL BODIES, SURFACE PROPERTIES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 723 62-3-2 DIV. 25

(*DYNAMICS, NONLINEAR SYSTEMS, THEORY OF *ELECTROMAGNETIC WAVES, PROPAGATION IN IONIZATION (IONIZED MEDIA).) (*RADIO WAVES, REFLECTION.) (ELECTRONS, DENSITY.) (*PLASMA PHYSICS, RESONANCE, PLASMA OSCILLATIONS, DIFFERENTIAL EQUATIONS, SPACE CHARGES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 726 62-3-2 DIV. 25

***ELECTROMETERS**

(*SATELLITE VEHICLES, INSTRUMENTATION, *ELECTROMETERS FOR MEASUREMENT OF ELECTROSTATIC FIELDS, IONS, PLASMA PHYSICS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 568 62-3-2 DIV. 12

***ELECTRON BEAMS**

(*PLASMA PHYSICS, *ELECTRON BEAMS, *PARTICLES, ELECTRONS, IONS IN MAGNETIC FIELDS, TRANSPORT PROPERTIES.) (TEMPERATURE, PRESSURE, ENERGY.) (TRANSFORMATIONS (MATHEMATICS), HYDRODYNAMICS, EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 645 62-3-2 DIV. 25

(*ELECTROMAGNETIC WAVES, *ELECTRON BEAMS.) (PLASMA OSCILLATIONS, RESONANCE SCATTERING, CYLINDRICAL BODIES, SURFACE PROPERTIES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 723 62-3-2 DIV. 25

(ANALYSIS OF INTERACTION BETWEEN *ELECTRON BEAMS AND TRANSVERSE ELECTROMAGNETIC FIELDS AND THE VELOCITY OF *NOISE, EXCITATION.) (EMISSION OF ELECTRONS FROM CATHODES.)
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT.
AD-274 829 62-3-2 DIV. 25

(*PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, BROADBAND, NARROWBAND, X BAND, K BAND, ELECTRONIC CIRCUITS, FEASIBILITY STUDIES, DESIGN, THEORY.) (*COUPLING

CIRCUITS; CYCLOTRONS; WAVE TRANSMISSION; PROPAGATION; HELIXES; IMPEDANCE; ELECTRON GUNS; MAGNETIC FIELDS; SPACE CHARGES; *ELECTRON BEAMS; TESTS.)
SPERRY GYROSCOPE CO.; GREAT NECK; N. Y.
AD-274 849 62-3-2 DIV. 8

*ELECTRON BOMBARDMENT

(EXCITATION BY *ELECTRON BOMBARDMENT OF SOLIDS; *NITROGEN CAUSING *LUMINESCENCE.) DIFFUSION THEORY; LOW TEMPERATURE RESEARCH.
CALIFORNIA U.; BERKELEY.
AD-274 798 62-3-2 DIV. 20

*ELECTRON TUBES

(*MICROWAVES; PROPAGATION; ELECTROMAGNETIC WAVES; *PLASMA PHYSICS; ELECTRON BEAMS; CESIUM; ELECTRIC FIELDS; NOISE (RADIO); NONLINEAR SYSTEMS; THEORY.) (*MICROWAVE EQUIPMENT; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTROMAGNETS; FREQUENCY MULTIPLIERS; DESIGN; TESTS.)
MICROWAVE LAB.; STANFORD U.; CALIF.
AD-274 557 62-3-2 DIV. 8

(*BACKWARD-WAVE OSCILLATORS; *RADIOFREQUENCY GENERATORS; PULSE TRANSFORMERS; PULSE GENERATORS; FEASIBILITY STUDIES; DESIGN; MANUFACTURING METHODS.) (*MICROWAVES; *WAVEGUIDES; ELECTRONIC CIRCUITS; MICROWAVE NETWORKS; SUPERHIGH FREQUENCY; ELECTROFORMING; STANDING WAVE RATIOS; MEASUREMENT.) (*ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTRON GUNS; BEAM POWER TUBES; ANODES (ELECTRON TUBES); MAGNETIC FIELDS; FOCUSING; MATERIALS; TEST EQUIPMENT.)
WATKINS-JOHNSON CO.; PALO ALTO; CALIF.
AD-274 718 62-3-2 DIV. 8

*ELECTRONIC CIRCUITS

(*PARAMETRIC AMPLIFIERS; SOLID STATE PHYSICS; C BAND; BROADBAND; DESIGN; TESTS.) (*MICROWAVE AMPLIFIERS; *ELECTRONIC CIRCUITS; TUNED CIRCUITS; TUNING CIRCUITS; DIODES; SILICON; PACKAGING; RESONANCE; THEORY; MATHEMATICAL ANALYSIS.) (*TUNED AMPLIFIERS; BACKWARD-WAVE OSCILLATORS.)
MICROMEGA CORP.; VENICE; CALIF.
AD-274 619 62-3-2 DIV. 8

*ELECTRONIC SWITCHES

(*DISPLAY SYSTEMS; SOLID STATE PHYSICS; LUMINESCENCE; *LUMINESCENT MATERIALS.) (*ELECTRONIC SWITCHES; PLATINUM; PALLADIUM; IONIC CURRENT; LIFE EXPECTANCY; ELECTROSTRICTION; SWITCHES.) (RESISTORS; *FERROELECTRIC MATERIALS; SUPPRESSORS.) (SANDWICH CONSTRUCTION; LAMINATES.)
WESTINGHOUSE ELECTRIC CORP.; BALTIMORE; MD.
AD-274 630 62-3-2 DIV. 8

*ELECTROSTATIC FIELDS

(*VAN ALLEN RADIATION BELT; *SATELLITE VEHICLES; *ELECTROSTATIC FIELDS; ELECTRIC POTENTIAL; PROTONS; ELECTRONS.)
RAND CORP.; SANTA MONICA; CALIF.
AD-274 399 62-3-2 DIV. 2

*ENERGY

(MECHANICAL PROPERTIES; *ENERGY; TRANSFORMERS.) (*PRESSURE EXCHANGERS; TURBINES; THRUST; LIFT; *FLUID FLOW.)
RENSSELAER POLYTECHNIC INST.; TROY; N. Y.
AD-274 780 62-3-2 DIV. 25

*ENTROPY

(*PLASMA PHYSICS; MECHANICAL PROPERTIES; *NON-LINEAR DIFFERENTIAL EQUATIONS; MAGNETIC FIELDS; ELECTROMAGNETIC EFFECTS; SOLAR ENERGY.) (*ENTROPY; PARTICLES; DISTRIBUTION THEORY.) *PLASMA OSCILLATIONS.
STANFORD RESEARCH INST.; MENLO PARK; CALIF.
AD-274 788 62-3-2 DIV. 25

*EPOXY RESINS

(*ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; MATERIALS; BINDERS; *HEAT RESISTANT POLYMERS; *COMPOSITE MATERIALS; SILICONE RESINS; *EPOXY RESINS; *PHENOLIC RESINS; ASBESTOS FIBERS; REINFORCING MATERIALS; MECHANICAL PROPERTIES; TESTS; AGING.) (PHTHALIC ANHYDRIDES; ANHYDRIDES; FURAN; CYANAMIDES; CYANURIC ACID; ESTERS; HETEROCYLIC COMPOUNDS; RESINS; CASTOR OIL.)
ATLANTIC RESEARCH CORP.; ALEXANDRIA; VA.
AD-274 533 62-3-2 DIV. 14

*ERRORS

(CODING AND *SWITCHING CIRCUITS FOR AUTOMATIC; *ERRORS; CORRECTIONS WITHIN *DIGITAL SYSTEMS.) (COMMUNICATION SYSTEMS; COMPUTER LOGIC.) (*DATA TRANSMISSION SYSTEMS; ELECTRICAL NETWORKS; DETECTION.) MATRIX ALGEBRA; *DIGITAL COMPUTERS.
STANFORD RESEARCH INST.; MENLO PARK; CALIF.
AD-274 689 62-3-2 DIV. 30

*ETHERS

(*HYDRAULIC FLUIDS; *PHENYL RADICALS; *OXYGEN COMPOUNDS; *ETHERS.) (TESTS; *RADIATION EFFECTS; NEUTRON BOMBARDMENT; GAMMA RAYS; TEST METHODS; STABILITY; OXIDATION; CORROSION.)
GENERAL DYNAMICS/FORT WORTH; TEX.
AD-274 518 62-3-2 DIV. 14

*ETHYL RADICALS

(*METALORGANIC COMPOUNDS; *ALUMINUM COMPOUNDS; *ETHYL RADICALS; SYNTHESIS; CHEMICAL REACTIONS; OXIDATION; DISPLACEMENT REACTIONS; CHEMICAL BONDS.) (HYDRIDES; NITROGEN COMPOUNDS; AZIDES; PHENYL RADICALS; CHLORIDES.) (THEORY; MOLECULAR STRUCTURE; INFRARED SPECTROSCOPY; CALORIMETERS; THERMODYNAMICS.)
NEW YORK U.; N. Y.
AD-274 699 62-3-2 DIV. 4

(PHOTOCHEMISTRY; PHOTOCHEMICAL REACTIONS; REACTION KINETICS; *PHOTOLYSIS OF HYDROCARBONS AND DEUTERATED COMPOUNDS CONTAINING *METHYL RADICALS; *ETHYL RADICALS; *IODIDES; LOW TEMPERATURE RESEARCH.) (PHOTONS; ABSORPTION AND *HYDROGEN ABSTRACTION; ENERGY DISSIPATION.) (SOLIDS; NITROGEN; KRYPTON; XENON.) INFRARED SPECTROSCOPY.
CALIFORNIA U.; BERKELEY.
AD-274 797 62-3-2 DIV. 4

*EXPLOSIVE FORMING

(METALS; DEFORMATION; *EXPLOSIVE FORMING; UNDERWATER EXPLOSIONS; *ELECTRIC DISCHARGES; *CAPACITORS; SHOCK WAVES; ELECTRICAL EQUIPMENT; CIRCUITS; ENERGY; ANALYSIS; ELECTRIC CURRENTS; ELECTRIC POTENTIAL.) SHEETS; PROCESSING.
REPUBLIC AVIATION CORP.; FARMINGDALE; N. Y.
AD-274 592 62-3-2 DIV. 26

*EXPLOSIVE TRAINS

(*EXPLOSIVES; *TEMPERATURE; SAFETY; HAZARDS; *EXPLOSIVE TRAINS.) (EXPLOSIVES; HEATING; REMOTE CONTROL SYSTEMS; TESTS; TEST EQUIPMENT; TEST METHODS.) (EXPLOSIVES; STABILITY; SENSITIVITY; *TEMPERATURE CONTROL; THERMAL EXPANSION.)
AEROJET-GENERAL CORP.; DOWNEY; CALIF.
AD-274 511 62-3-2 DIV. 22

*EXPLOSIVES

(*EXPLOSIVES; *TEMPERATURE; SAFETY; HAZARDS; *EXPLOSIVE TRAINS.) (EXPLOSIVES; HEATING; REMOTE CONTROL SYSTEMS; TESTS; TEST EQUIPMENT; TEST METHODS.) (EXPLOSIVES; STABILITY; SENSITIVITY; *TEMPERATURE CONTROL; THERMAL EXPANSION.)
AEROJET-GENERAL CORP.; DOWNEY; CALIF.
AD-274 511 62-3-2 DIV. 22

*EXTRATERRESTRIAL RADIO WAVES

(*EXTRATERRESTRIAL RADIO WAVES; ATTENUATION; IONOSPHERE; SOLAR ENERGY; *PROTONS; SOLAR FLARES; MAGNETIC STORMS.)
GEOPHYSICAL INST.; U. OF ALASKA; COLLEGE.
AD-274 462 62-3-2 DIV. 2

*EXTREMELY HIGH FREQUENCY

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES.) (RADIO EQUIPMENT; EXTREMELY HIGH FREQUENCY.) (SOUND GENERATORS; ULTRASONIC RADIATION.)
EMERTRON, INC.; SILVER SPRING; MD.
AD-274 809 62-3-2 DIV. 8

*EXTRUSION

(*TUNGSTEN; *TUNGSTEN ALLOYS (W-3MO); MOLYBDENUM ALLOYS; *EXTRUSION; PRODUCTION; PROCESSING; SURFACE PROPERTIES.) (MICROSTRUCTURE; DIES; MATERIALS; LUBRICANTS; GLASS; GLASS TEXTILES.) (CASTINGS; CHEMICAL ANALYSIS; NON-DESTRUCTIVE TESTING; ULTRASONICS; HEATING; HEAT TREATMENT; TEMPERATURE.)
WAH CHANG CORP.; ALBANY; OREG.
AD-274 767 62-3-2 DIV. 17

*FATIGUE (MECHANICS)

(SHEETS; *ALUMINUM ALLOYS (7075-T6 AND X7275-T6); ZINC ALLOYS; MAGNESIUM ALLOYS; SENSITIVITY; FRACTURE (MECHANICS); PROPAGATION; *FATIGUE (MECHANICS); PARTICLES; MECHANICAL PROPERTIES; DEFORMATION; PLASTICITY; STRESSES.) ALLOYS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 963 62-3-2 DIV. 17

(*METALS; *STRUCTURES; *FATIGUE (MECHANICS); STRESSES; DEFORMATION.) (ALUMINUM ALLOYS (7075-T6); STAINLESS STEEL (301; A-286); TITANIUM ALLOYS (6AL-1MO-1V).) (METAL JOINTS; RIVETED JOINTS.) PHOTOELASTICITY.
GENERAL DYNAMICS/CONVAIR; SAN DIEGO; CALIF.
AD-274 936 62-3-2 DIV. 25

*FERROELECTRIC MATERIALS

(*DISPLAY SYSTEMS; SOLID STATE PHYSICS; LUMINESCENCE; *LUMINESCENT MATERIALS.) (*ELECTRONIC SWITCHES; PLATINUM; PALLADIUM; IONIC CURRENT; LIFE EXPECTANCY; ELECTROSTRICTION; SWITCHES.) (RESISTORS; *FERROELECTRIC MATERIALS; SUPPRESSORS.) (SANDWICH CONSTRUCTION; LAMINATES.)
WESTINGHOUSE ELECTRIC CORP.; BALTIMORE; MD.
AD-274 630 62-3-2 DIV. 8

*FERROMAGNETISM

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM; THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB.; CORONA; CALIF.
AD-274 504 62-3-2 DIV. 25

*FINS

(*HYPERSONIC TEST VEHICLES; *FINS; AERODYNAMIC CONFIGURATIONS; WIND TUNNEL MODELS; SUPERSONICS; AERODYNAMICS; STABILITY (LONGITUDINAL); PITCH; MOMENTS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 576 62-3-2 DIV. 9

*FLAME PROPAGATION

(*FLAME PROPAGATION; THEORY; THERMODYNAMICS; REACTION KINETICS; *FLAMES.)
THEORETICAL CHEMISTRY LAB.; U. OF WISCONSIN; MADISON.
AD-274 638 62-3-2 DIV. 25

*FLIGHT INSTRUMENTS

(*FLIGHT INSTRUMENTS; MEASUREMENT OF PRESSURE.) (*PITOT TUBES; SUPERSONICS; AERODYNAMICS; MODEL TESTS; WIND TUNNEL MODELS.)
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER; LOS ANGELES.
AD-274 625 62-3-2 DIV. 9

*FLUID FLOW

(MECHANICAL PROPERTIES; *ENERGY; TRANSFORMERS.) (*PRESSURE EXCHANGERS; TURBINES; THRUST; LIFT; *FLUID FLOW.)
RENSSELAER POLYTECHNIC INST.; TROY; N. Y.
AD-274 780 62-3-2 DIV. 25

(*PARTIAL DIFFERENTIAL EQUATIONS; *NUMERICAL METHODS AND PROCEDURES; INTEGRATION; DIFFERENTIAL EQUATIONS; SERIES.) (PIPES; *FLUID FLOW; RELAXATION TIME; VISCOSITY; REYNOLDS NUMBER; CONFIGURATION.)
WEIZMANN INST. (ISRAEL).
AD-274 808 62-3-2 DIV. 15

*FLUID MECHANICS

(*FLUID MECHANICS; GASES; PARTICLES; MIXTURES; *GAS FLOW; GAS IONIZATION; MAGNETOHYDRODYNAMICS; *PLASMA PHYSICS; PLASMA JETS; THERMODYNAMICS; *REACTION KINETICS; KINETIC THEORY; CHEMICAL REACTIONS; SURFACES; CATALYSIS.) (ALUMINUM; SOLID ROCKET PROPELLANTS; *COMBUSTION; FLARES.) *JET PROPULSION; RECOMBINATION REACTIONS.
JAMES FORRESTAL RESEARCH CENTER; PRINCETON U.; N. J.
AD-274 748 62-3-2 DIV. 9

(*THERMODYNAMICS; *IRREVERSIBLE PROCESSES; *FLUID MECHANICS; GASES; DIFFUSION; PRESSURE; PHYSICAL CHEMISTRY.) (*KINETIC THEORY; ENTROPY; GAS FLOW.) (*MATHEMATICAL ANALYSIS; PARTIAL DIFFERENTIAL EQUATIONS.)
FRANKFORD ARSENAL, PHILADELPHIA, PA.
AD-274 781 62-3-2 DIV. 9

***FLUORIDES**

(*SINGLE CRYSTALS; *CRYSTALS; MICA; THIN FILMS; GROWTH; *CRYSTALLIZATION; ZONE MELTING; MANUFACTURING METHODS; CRYSTAL OVENS; LABORATORY EQUIPMENT; *BIBLIOGRAPHY.) (PRODUCTION; SHEETS; SOLIDS; SOLUTIONS; *POTASSIUM COMPOUNDS; ALUMINUM COMPOUNDS; *RUBIDIUM COMPOUNDS; BORON COMPOUNDS; *FLUORIDES; *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***FLUORINE**

(*OXYGEN; *FLUORINE; *CHEMICAL BONDS; THERMOCHEMISTRY.) (NITROGEN COMPOUNDS; *OXYFLUORIDES; FLUORIDES; CHLORINE COMPOUNDS; NITRATES.) (SYNTHESIS; HEAT OF FORMATION; HEAT OF REACTION; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY; FRACTIONATION.) (DESIGN OF COMBUSTION; CALORIMETERS.)
UNITED TECHNOLOGY CORP., SUNNYVALE, CALIF.
AD-274 690 62-3-2 DIV. 4

***FLUTTER**

(*TAILS; *STABILIZERS (HORIZONTAL TAIL SURFACE); WIND TUNNEL MODELS; LOAD DISTRIBUTION; PRESSURE AT *FLUTTER; FREQUENCY DURING SUBSONIC FLOW; MATHEMATICAL ANALYSIS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 571 62-3-2 DIV. 9

***FLYING PLATFORMS**

(*FLYING PLATFORMS; GROUND EFFECT; AERODYNAMICS; SUBSONIC FLOW; DYNAMICS; EQUATIONS; MOTION; OSCILLATION; MATHEMATICAL ANALYSIS.)
HYDRONAUTICS, INC., ROCKVILLE, MD.
AD-274 546 62-3-2 DIV. 1

(DESIGN OF GROUND EFFECT; AMPHIBIAN PLANES; *FLYING PLATFORMS FOR AMPHIBIOUS OPERATIONS; CARGO VEHICLES.) (AERODYNAMIC CONFIGURATIONS; MONOCOQUES; AIRFRAMES; JET PROPULSION; LOAD DISTRIBUTION; CONTROL SYSTEMS; AIRPLANE LANDINGS; ANALYSIS.) (MATHEMATICAL ANALYSIS; STRUCTURES; STRESSES.)
RYAN AERONAUTICAL CO., SAN DIEGO, CALIF.
AD-274 837 62-3-2 DIV. 1

***FORGE PRESSES**

(*FORGE PRESSES; CARBIDES; TUNGSTEN COMPOUNDS; COBALT; PHYSICAL PROPERTIES; STRESSES; TESTS; DESIGN; CONFIGURATION.) (LOAD DISTRIBUTION; *PHOTOELASTICITY.)
ENGINEERING SUPERVISION CO., NEW YORK.
AD-274 731 62-3-2 DIV. 21

***FOURIER ANALYSIS**

(*COMPUTERS; *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS; SERIES.) (THEORY AND STRUCTURES OF DATA PROCESSING SYSTEMS; *DATA STORAGE SYSTEMS.) (ERRORS; NUMERICAL ANALYSIS; SEQUENCES.)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***FUEL CELLS**

(POWER SUPPLIES; *FUEL CELLS; ELECTROLYTIC CELLS; DESIGN; *HYDROGEN; *OXYGEN; THEORY; *ELECTRODES; GRAPHITE; TEST METHODS.)
NEW YORK STATE COLL. OF CERAMICS, ALFRED U.
AD-274 614 62-3-2 DIV. 7

***GAMES THEORY**

(*COMBAT; *WARFARE; *GAMES THEORY; EQUATIONS; DIGITAL COMPUTERS.) (COMMUNICATION SYSTEMS; MILITARY COMMUNICATIONS; MILITARY INTELLIGENCE; DETERIORATION; SIMULATION; MILITARY OPERATIONS.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 739 62-3-2 DIV. 18

***GAMMA RAYS**

(*NUCLEAR PHYSICS; *ELECTROMAGNETIC FIELDS; *NUCLEAR ENERGY LEVELS; *NUCLEI; EXCITATION; *GAMMA RAYS; THEORY; PROBABILITY OF NUCLEAR MODELS.) (ELECTRONS; PHOTONS; ISOTOPES; RADIOACTIVITY.) (OXYGEN; CALCIUM; ZIRCONIUM; FLUORINE; STRONTIUM.)
STRASBOURG U. (FRANCE).
AD-274 739 62-3-2 DIV. 20

***GARNET**

(*DYSPROSIUM; IRON COMPOUNDS; *GARNET; *HYPERFINE STRUCTURE; QUADRUPOLE MOMENTS; ELECTRON TRANSITIONS; QUANTUM MECHANICS; NUCLEAR STATES; NUCLEAR SPINS; NUCLEAR RESONANCE; NUCLEAR MAGNETIC MOMENTS; EXCITATION; LOW TEMPERATURE RESEARCH.) (SPECTROGRAPHIC ANALYSIS; GAMMA RAYS; ABSORPTION.) ISOTOPES.
HEBREW U. (ISRAEL).
AD-274 553 62-3-2 DIV. 25

(*BIBLIOGRAPHY; *CRYSTALS; GROWTH; PREPARATION; LASERS.) (*GARNET; *RUBY; *CORUNDUM; *SPINELS; SAPPHIRES; FERRITES; METALLIC COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE; SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 642 62-3-2 DIV. 14

***GAS BEARINGS**

(*GAS BEARINGS; AIR OR GASES; LUBRICATION; *JOURNAL BEARINGS; TESTS.) (VELOCITY; VECTOR ANALYSIS; MOTION; LOADING; HYSTERESIS.)
INTERNATIONAL BUSINESS MACHINES CORP., SAN JOSE, CALIF.
AD-274 551 62-3-2 DIV. 9

(HYBRID; *GAS BEARINGS; TESTS; LOAD DISTRIBUTION AND STABILITY ON DYNAMICS; ROTATION.) (ORIFICES; PRESSURE.)
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 655 62-3-2 DIV. 23

***GAS FLOW**

(*FLUID MECHANICS; GASES; PARTICLES; MIXTURES; *GAS FLOW; GAS IONIZATION; MAGNETOHYDRODYNAMICS; *PLASMA PHYSICS; PLASMA JETS; THERMODYNAMICS; *REACTION KINETICS; KINETIC THEORY; CHEMICAL REACTIONS; SURFACES; CATALYSIS.) (ALUMINUM; SOLID ROCKET PROPELLANTS; *COMBUSTION; FLARES.) *JET PROPULSION; RECOMBINATION REACTIONS.
JAMES FORRESTAL RESEARCH CENTER, PRINCETON U., N. J.
AD-274 748 62-3-2 DIV. 9

(BLUNT BODIES; *AIRFOILS; CONICAL BODIES; HEAT TRANSFER; HYPERSONICS.) (*GAS FLOW; *COMBUSTION CHAMBER GASES; PRESSURE; WATER VAPOR; CONDENSATION.)
ROSEMOUNT AERONAUTICAL LABS., U. OF MINN., MINNEAPOLIS.
AD-274 792 62-3-2 DIV. 25

***GAS IONIZATION**

(SHOCK WAVES; *GAS IONIZATION; PLASMA PHYSICS; *REACTION KINETICS; PHOTOEMISSION; LUMINESCENCE; ULTRAVIOLET RADIATION; CHEMICAL REACTIONS; *ACETYLENE WITH *OXYGEN; MIXTURES WITH ARGON; ADDITIVES; ACETONES; METHYL RADICALS; LEAD COMPOUNDS.) (OXIDATION; IONIZATION; TEST METHODS.)
GIBBS CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS
AD-274 947 62-3-2 DIV. 4

(*SPECTROGRAPHIC ANALYSIS; SHOCK TUBES; *SHOCK WAVES; *GAS IONIZATION; GAS DISCHARGES; PLASMA JETS; *HYDROGEN; IMPURITIES.) (ELECTROMAGNETIC WAVES; *SPECTROGRAPHIC DATA; INTENSITY; WAVE ANALYSIS; MOLECULAR SPECTROSCOPY; GASES.) (LABORATORY EQUIPMENT; INSPECTION WINDOWS; QUARTZ.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 706 62-3-2 DIV. 25

***GASES**

(*REACTION KINETICS; *DISSOCIATION; *RECOMBINATION REACTIONS; *GASES; IONS; MOLECULES DURING *IONIZATION; MOLECULAR ROTATION; VIBRATION; RELAXATION TIME AT HIGH TEMPERATURE RESEARCH; ENERGY TRANSFER EXCITATION; ATOMIC ENERGY LEVELS, THEORY.) SHOCK WAVES; ATMOSPHERE ENTRY.
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 467 62-3-2 DIV. 4

(SOLIDS; *PARTICLES; DETECTION BY LIGHT; SCATTERING; INTENSITY; PHOTOEMISSION; REFRACTIVE INDEX; *OPTICAL ANALYSIS.) (*GASES; *CONDENSATION; SHOCK TUBES; MEASUREMENT.) (FEASIBILITY STUDIES; THEORY.)
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 913 62-3-2 DIV. 25

(*GASES; GAS IONIZATION; METALS; SOLVATES; VAPORS; IONIZATION; IONS.) (SOLVENT ACTION; *AMMONIA; CHEMICAL REACTIONS; PHYSICAL PROPERTIES; *TEMPERATURE COEFFICIENT OF REACTIVITY; THERMODYNAMICS.) (SOLUTIONS; SODIUM; AMMONIA.)
UNIFIED SCIENCE ASSOCIATES, INC., PASADENA, CALIF.
AD-274 615 62-3-2 DIV. 25

(*SUPERSONIC FLOW; *GASES; AIR AND FREON INJECTION INTO *LAMINAR BOUNDARY LAYER AND *TURBULENT BOUNDARY LAYER; PRESSURE; MEASUREMENT AT MACH NUMBER.) (WIND TUNNELS; TESTS OF MODEL CONFIGURATIONS.)
CENTRE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, BRUSSELS (BELGIUM).
AD-274 762 62-3-2 DIV. 9

(*HYDRODYNAMICS; STABILITY IN *DISSOCIATION OF *GASES.) (HYPERSONICS; GAS FLOW AND VORTICES; SHEETS; BLUNT BODIES; CONICAL BODIES; WEDGES; CYLINDRICAL BODIES.)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 782 62-3-2 DIV. 9

***GEODESICS**

(*ALGEBRAIC TOPOLOGY; *RELATIVITY THEORY; *GEODESICS; PARTICLE TRAJECTORIES; LIGHT TRANSMISSION.) (*STATISTICAL TESTS; PARTIAL DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS).
RAND CORP., SANTA MONICA, CALIF.
AD-274 598 62-3-2 DIV. 15

***GEOGRAPHY**

(*ANTARCTIC REGIONS; GEOPHYSICS; *GEOGRAPHY; GEOLOGICAL SURVEY; GLACIERS.)
GEOPHYSICAL AND POLAR RESEARCH CENTER, U. OF WISCONSIN, MADISON.
AD-274 770 62-3-2 DIV. 2

***GEOLOGICAL SURVEY**

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***GEOLOGY**

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***GEOPHYSICAL PROSPECTING**

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***GEOPHYSICS**

(INSTRUMENTATION OF *SATELLITE VEHICLES; SPACE PROBES FOR MEASUREMENT OF *IONOSPHERE; *SPACE ENVIRONMENTAL CONDITIONS INCLUDING PARTICLES; IONS; ELECTRONS; DENSITY; TEMPERATURE.) (*GEOPHYSICS; TERRESTRIAL MAGNETISM; PLASMA PHYSICS; TESTS.) (FLIGHT TESTING OF SATELLITE ATTITUDE; DETECTORS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 563 62-3-2 DIV. 2

***GERMANIUM**

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; THIN FILMS; SINGLE CRYSTALS; *GERMANIUM; SILICON; SURFACES; SURFACE PROPERTIES; PREPARATION; ULTRAVIOLET RADIATION; *CATALYSIS; CHEMICAL REACTIONS; OXIDATION; BENZALDEHYDES TO BENZOIC ACIDS; ELECTRICAL PROPERTIES; IMPEDANCE; ELECTRIC POTENTIAL.) (TEST EQUIPMENT; METERS; RESISTANCE MEASUREMENT.) *CRYSTAL RECTIFIERS.
RADLEY, J. A., RESEARCH INST., CAMDEN, N. J.
AD-274 756 62-3-2 DIV. 8

***GLOW DISCHARGES**

(*GLOW DISCHARGES; *DISCHARGE TUBES; *IMPEDANCE; *IONIC CURRENT; TESTS; MEASUREMENT; MATHEMATICAL ANALYSIS.) (ARGON; ELECTRON TUBES; CATHODES (ELECTRON TUBES); IMPEDANCE BRIDGES; IONS; TEST EQUIPMENT.)
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
AD-274 470 62-3-2 DIV. 8

***GRAVITY**

(*GRAVITY; *RELATIVITY THEORY; ALGEBRAIC TOPOLOGY; TENSOR ANALYSIS; CALCULUS OF VARIATIONS.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 838 62-3-2 DIV. 15

***GUIDED MISSILE ANTENNAS**

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM; THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 504 62-3-2 DIV. 25

***GUIDED MISSILE FUZES**

(*BIBLIOGRAPHY; *GUIDED MISSILES.) (*RADAR; *RADAR ANTENNAS; RADAR ANTIJAMMING; RADAR DECEPTION; RADAR JAMMING; COUNTERMEASURES; RADAR TRACKING.) (INFRARED PHOTOCONDUCTORS; PHOTOELECTRIC MATERIALS; DETECTION.) *GUIDED MISSILE FUZES; FERROELECTRIC MATERIALS; SCIENTIFIC RESEARCH; CHEMISTRY; POLYMERS.
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 961 62-3-2 DIV. 12

***GUIDED MISSILES**

(*BIBLIOGRAPHY; REPORTS; *GUIDED MISSILES; GUIDED MISSILE BOOSTERS; SPACESHIPS.) (MAGNETOHYDRODYNAMICS; ELECTROMAGNETIC WAVES; FLUID MECHANICS.) (BERYLLIUM COMPOUNDS; OXIDES.) PROPELLANTS; COUNTERMEASURES; AERODYNAMICS.
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 909 62-3-2 DIV. 12

(*BIBLIOGRAPHY; *GUIDED MISSILES.) (*RADAR; *RADAR ANTENNAS; RADAR ANTIJAMMING; RADAR DECEPTION; RADAR JAMMING; COUNTERMEASURES; RADAR TRACKING.) (INFRARED PHOTOCONDUCTORS; PHOTOELECTRIC MATERIALS; DETECTION.) *GUIDED MISSILE FUZES; FERROELECTRIC MATERIALS; SCIENTIFIC RESEARCH; CHEMISTRY; POLYMERS.
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 961 62-3-2 DIV. 12

***GYROSCOPES**

(*GYROSCOPES; DRIFT; ACCELERATION; TEST METHODS; AIRBORNE.) INERTIAL NAVIGATION; INERTIAL GUIDANCE.
AERONAUTICAL INSTRUMENTS LAB., NAVAL AIR DEVELOPMENT CENTER, JOHNSVILLE, PA.
AD-274 458 62-3-2 DIV. 19

***HANDBOOKS**

(*WAVEGUIDES; C BAND; K BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (WAVEGUIDE JOINTS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *CAVITY RESONATORS; FREQUENCY SHIFT; TUNING DEVICES; ELECTRIC FIELDS; MAGNETRONS; *RADIOFREQUENCY POWER; PRESSURE; GASES; AIR; MEASUREMENT; *MICROWAVES; TEMPERATURE; TEST EQUIPMENT; *HANDBOOKS.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 822 62-3-2 DIV. 8

***HEAT RESISTANT ALLOYS**

(*BIBLIOGRAPHY; *METALS; *HEAT RESISTANT ALLOYS; *CERAMIC MATERIALS; *REFRACTORY MATERIALS; ALLOYS.) (STEEL; STAINLESS STEEL; IRON ALLOYS; NICKEL ALLOYS; BERYLLIUM; TITANIUM; MAGNESIUM; NIOBIUM; CHROMIUM; MOLYBDENUM; TANTALUM; VANADIUM; TUNGSTEN.)
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
AD-274 649 62-3-2 DIV. 17

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS);) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

(*STAINLESS STEEL; *HEAT RESISTANT ALLOYS; *CORROSION RESISTANT ALLOYS; AUSTENITE; MARTENSITE; DISPERSION HARDENING; HEAT TREATMENT; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; DATA.) (DEFORMATION; PHASE TRANSITIONS; COOLING; AGING.)
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO
AD-274 805 62-3-2 DIV. 17

***HEAT RESISTANT POLYMERS**

(*HEAT RESISTANT POLYMERS; *ELASTOMERS; *SILICON COMPOUNDS; *NITROGEN COMPOUNDS; SYNTHESIS.) (POLYMERS; CHLORINE COMPOUNDS; METHYL RADICALS; PHENYL RADICALS; SILANES; AZO RADICALS; CYCLOPENTANES; CYCLOHEXANES; PROPYL RADICALS; AMINES.) (POLYMERIZATION; MOLECULAR STRUCTURE; VISCOSITY; MOLECULAR WEIGHT.) INFRARED SPECTROSCOPY; CHEMICAL ANALYSIS.
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 489 62-3-2 DIV. 4

(*ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; MATERIALS; BINDERS; *HEAT RESISTANT POLYMERS; *COMPOSITE MATERIALS; SILICONE RESINS; *EPOXY RESINS; *PHENOLIC RESINS; ASBESTOS FIBERS; REINFORCING MATERIALS; MECHANICAL PROPERTIES; TESTS; AGING.) (PHTHALIC ANHYDRIDES; ANHYDRIDES; FURAN; CYANAMIDES; CYANURIC ACID; ESTERS; HETEROCYLIC COMPOUNDS; RESINS; CASTOR OIL.)
ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
AD-274 533 62-3-2 DIV. 14

(*HEAT RESISTANT POLYMERS; SULFANURIC *SULFONYL RADICALS; *CHLORIDES; SYNTHESIS BY DECOMPOSITION; PYROLYSIS; CHLORINE COMPOUNDS; PHOSPHORUS COMPOUNDS; AZO RADICALS; SULFONYL RADICALS; CHLORIDES; ISOMER; HETEROCYCLIC COMPOUNDS.) (CHEMICAL REACTIONS; THIONYL CHLORIDES WITH AMMONIUM RADICALS; CHLORIDES; SULFAMYL RADICALS; AMINES.)
ILLINOIS U., URBANA.
AD-274 661 62-3-2 DIV. 4

(*HEAT RESISTANT POLYMERS; *POLYMERS; METALORGANIC COMPOUNDS; *BORON COMPOUNDS; *PHOSPHORUS COMPOUNDS; ORGANOBORANES; BORINES; PENTABORANES; DECABORANES; PHOSPHINOBORINES; CHEMICAL REACTIONS; SYNTHESIS.) (PHENYL RADICALS; PHOSPHINES; DECABORANES.) (PYROLYSIS; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY.)
OLIN MATHIESON CHEMICAL CORP., NEW HAVEN, CONN.
AD-274 830 62-3-2 DIV. 4

***HEAT TRANSFER**

(*CONICAL BODIES; BODIES OF REVOLUTION; CYLINDRICAL BODIES; WIND TUNNEL MODELS; HYPERSONICS; LAMINAR BOUNDARY LAYER; TURBULENT FLOW; BOUNDARY LAYER; TURBULENCE; SEPARATION; *HEAT TRANSFER; PRESSURE; LOAD DISTRIBUTION; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 584 62-3-2 DIV. 9

(*MAGNETOHYDRODYNAMICS; VORTEX GENERATORS; FEASIBILITY STUDIES; TESTS; DESIGN.) (ENERGY; TEMPERATURE; *HEAT TRANSFER; PRESSURE; ELECTRICAL CONDUCTANCE; GAS IONIZATION.) (TENSILE PROPERTIES OF TANTALUM.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 644 62-3-2 DIV. 25

(ROCKET MOTORS; SOLID ROCKET PROPELLANTS; EXHAUST GASES; *HEAT TRANSFER TO *ROCKET MOTOR NOZZLES; TESTS.) (PARTICLES; DROPS; DEPOSITS OF ALUMINUM COMPOUNDS; OXIDES.) TEMPERATURE; THERMAL INSULATION; THEORY; MATHEMATICAL ANALYSIS; EQUATIONS.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
AD-274 648 62-3-2 DIV. 27

(*WAVEGUIDES; S BAND; X BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (WAVEGUIDE JOINTS; *WAVEGUIDE BENDS; CAVITY RESONATORS; AIR; ELECTRIC FIELDS.) (MICROWAVES; PROPAGATION; ATTENUATION.) (*HEAT TRANSFER; COOLING; TEMPERATURE; GASES; PRESSURE.) (HARMONIC ANALYSIS; MATHEMATICAL ANALYSIS; MEASUREMENT; TEST EQUIPMENT.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 821 62-3-2 DIV. 8

(*HEAT TRANSFER; TESTS ON STAINLESS STEEL; *STEEL TUBING AT SUBSONIC FLOW OF AIR AT HIGH PRESSURE RESEARCH AND HIGH TEMPERATURE RESEARCH AT REYNOLDS NUMBER.)
POLYTECHNIC INST. OF BROOKLYN, N. Y.
AD-274 834 62-3-2 DIV. 25

***HEIGHT FINDING**

(*CLOUD HEIGHT INDICATORS; METEOROLOGICAL RADAR; *CONVECTION; ERRORS; RADAR ECHO AREAS.) (RADAR SCANNING; *HEIGHT FINDING; ECHO RANGING.)
FLORIDA STATE U., TALLAHASSEE.
AD-274 730 62-3-2 DIV. 2

***HIGH PRESSURE RESEARCH**

(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; *RADOMES; TEST FACILITIES; DESIGN.) (*RADAR STATIONS; CONSTRUCTION; RADAR EQUIPMENT; COMMUNICATION EQUIPMENT; INSTRUMENTATION.) (SEARCH RADAR; RADAR TRACKING; MASERS.) (*HIGH PRESSURE RESEARCH; INSTRUMENTATION.) RADIOMETERS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 923 62-3-2 DIV. 8

***HIGH PRESSURE VALVES**

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS.) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE.) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

***HIGH TEMPERATURE RESEARCH**

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM; THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 504 62-3-2 DIV. 25

***HUMAN ENGINEERING**

(*HUMAN ENGINEERING; *BIBLIOGRAPHY.)
ARMED SERVICES TECHNICAL INFORMATION AGENCY, ARLINGTON, VA.
AD-274 800 62-3-2 DIV. 28

***HYDRAULIC FLUIDS**

(*HYDRAULIC FLUIDS; *PHENYL RADICALS; *OXYGEN COMPOUNDS; *ETHERS.) (TESTS; *RADIATION EFFECTS; NEUTRON BOMBARDMENT; GAMMA RAYS; TEST METHODS; STABILITY; OXIDATION; CORROSION.)
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 518 62-3-2 DIV. 14

***HYDRODYNAMICS**

(*HYDRODYNAMICS; STABILITY IN *DISSOCIATION OF *GASES.) (HYPERSONICS; GAS FLOW AND VORTICES; SHEETS; BLUNT BODIES; CONICAL BODIES; WEDGES; CYLINDRICAL BODIES.)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 782 62-3-2 DIV. 9

***HYDROGEN**

(*HYDROGEN; *MOLECULES; ATOMS; *QUANTUM MECHANICS; ATOMIC ORBITALS; NUCLEAR SPINS; ENERGY; *NUCLEAR SHELL MODELS; THEORY; *NUCLEAR ENERGY LEVELS.)
THEORETICAL CHEMISTRY LAB., U. OF WISCONSIN, MADISON.
AD-274 631 62-3-2 DIV. 25

(*SPECTROGRAPHIC ANALYSIS; SHOCK TUBES; *SHOCK WAVES; *GAS IONIZATION; GAS DISCHARGES; PLASMA JETS; *HYDROGEN; IMPURITIES.) (ELECTROMAGNETIC WAVES; *SPECTROGRAPHIC DATA; INTENSITY; *WAVE ANALYSIS; MOLECULAR SPECTROSCOPY; GASES.) (LABORATORY EQUIPMENT; INSPECTION WINDOWS; QUARTZ.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 706 62-3-2 DIV. 25

(PHOTOCHEMISTRY; PHOTOCHEMICAL REACTIONS; REACTION KINETICS; *PHOTOLYSIS OF HYDROCARBONS AND DEUTERATED COMPOUNDS CONTAINING *METHYL RADICALS; *ETHYL RADICALS; *IODIDES; LOW TEMPERATURE RESEARCH.) (PHOTONS; ABSORPTION AND *HYDROGEN ABSTRACTION; ENERGY DISSIPATION.) (SOLIDS; NITROGEN; KRYPTON; XENON.) INFRARED SPECTROSCOPY.
CALIFORNIA U., BERKELEY.
AD-274 797 62-3-2 DIV. 4

***HYPERFINE STRUCTURE**

(*DYSPROSIUM: IRON COMPOUNDS: *GARNET: *HYPERFINE STRUCTURE: QUADRUPOLE MOMENTS: ELECTRON TRANSITIONS: QUANTUM MECHANICS: NUCLEAR STATES: NUCLEAR SPINS: NUCLEAR RESONANCE: NUCLEAR MAGNETIC MOMENTS: EXCITATION: LOW TEMPERATURE RESEARCH.) (SPECTROGRAPHIC ANALYSIS: GAMMA RAYS: ABSORPTION.) ISOTOPES.
HEBREW U. (ISRAEL).
AD-274 583 62-3-2 DIV. 25

***HYPERSONIC FLOW**

*VORTICES IN CONDENSATION TRAILS OF *HYPERVELOCITY PROJECTILES: *PELLETS IN XENON: BLUNT BODIES IN *SUBSONIC FLOW AND *HYPERSONIC FLOW AT LOW REYNOLDS NUMBER: SELF LUMINESCENCE: PHOTOGRAPHS OF TURBULENT FLOW: HYPERSONICS: WAKE.
AVCO EVERETT RESEARCH LAB.: MASS.
AD-274 535 62-3-2 DIV. 9

***HYPERSONIC TEST VEHICLES**

(*HYPERSONIC TEST VEHICLES: *FINS: AERODYNAMIC CONFIGURATIONS: WIND TUNNEL MODELS: SUPERSONICS: AERODYNAMICS: STABILITY (LONGITUDINAL): PITCH: MOMENTS: MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION: WASHINGTON: D. C.
AD-274 576 62-3-2 DIV. 9

***HYPERVELOCITY PROJECTILES**

*VORTICES IN CONDENSATION TRAILS OF *HYPERVELOCITY PROJECTILES: *PELLETS IN XENON: BLUNT BODIES IN *SUBSONIC FLOW AND *HYPERSONIC FLOW AT LOW REYNOLDS NUMBER: SELF LUMINESCENCE: PHOTOGRAPHS OF TURBULENT FLOW: HYPERSONICS: WAKE.
AVCO EVERETT RESEARCH LAB.: MASS.
AD-274 535 62-3-2 DIV. 9

***HYPERVELOCITY VEHICLES**

(*SATELLITE VEHICLES: *SPACESHIPS: *HYPERVELOCITY VEHICLES: LUNAR VEHICLES: HAZARDS TO HIGH ALTITUDE: *SPACE ENVIRONMENTAL CONDITIONS: UPPER ATMOSPHERE.) (PRESSURE: DENSITY: TEMPERATURE: SOLAR ENERGY: ELECTROMAGNETIC WAVES: COSMIC RAYS: VAN ALLEN RADIATION BELT: PLASMA PHYSICS: AURORAE: MAGNETIC FIELDS: TERRESTRIAL MAGNETISM.) (AIRFRAMES: MATERIALS: PLASTICS: CERAMIC MATERIALS: ORGANIC MATERIALS: METALS: ALLOYS: CONTROL SYSTEMS: ELECTRONIC EQUIPMENT: ELECTRICAL EQUIPMENT: COMMUNICATION SYSTEMS: AUXILIARY POWER PLANTS: CLOSED-CYCLE ECOLOGICAL SYSTEMS.) (SHOCK: AERODYNAMIC HEATING: METEORITES.)
RADIO CORP. OF AMERICA: CAMDEN: N. J.
AD-274 841 62-3-2 DIV. 12

***IDENTIFICATION SYSTEMS**

(*IDENTIFICATION SYSTEMS: MAN OR MACHINES: FEASIBILITY STUDIES: ERRORS: TIME.)
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB.: FORT MONMOUTH: N. J.
AD-274 786 62-3-2 DIV. 28

***IGNITION**

(*SOLID ROCKET PROPELLANTS: *PROPELLANT GRAINS: TEMPERATURE: PRESSURE: *IGNITION: FLAMES: *COMBUSTION: FLAME PROPAGATION: THEORY: TESTS: MATHEMATICAL ANALYSIS: EQUATIONS.) SHOCK TUBES.
UTAH U.: SALT LAKE CITY.
AD-274 624 62-3-2 DIV. 10

***IMPEDANCE**

(*GLOW DISCHARGES: *DISCHARGE TUBES: *IMPEDANCE: *IONIC CURRENT: TESTS: MEASUREMENT: MATHEMATICAL ANALYSIS.) (ARGON: ELECTRON TUBES: CATHODES (ELECTRON TUBES): IMPEDANCE BRIDGES: IONS: TEST EQUIPMENT.)
DIAMOND ORDNANCE FUZE LABS.: WASHINGTON: D. C.
AD-274 470 62-3-2 DIV. 8

***INSTRUMENTATION**

(*TRANSDUCERS: MEASUREMENT: ELECTRICAL CONDUCTANCE: *PLASMA JETS: *INSTRUMENTATION.) (GAS FLOW: VELOCITY: TESTS: ARGON.) (CONDUCTORS: CALIBRATION: ALUMINUM: STAINLESS STEEL: GRAPHITE.)
AEROSPACE CORP.: LOS ANGELES: CALIF.
AD-274 695 62-3-2 DIV. 25

***INTEGRATION**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY THEORY OF *SOLIDS.) (*MECHANICS: SHEAR STRESSES: LOAD DISTRIBUTION: DEFORMATION: DYNAMICS: POTENTIAL THEORY: KINETIC THEORY.) (*SOLID STATE PHYSICS: CRYSTALS: METALLIC CRYSTALS.)
LABORATORY FOR INSULATION RESEARCH: MASS. INST. OF TECH.: CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

***INTERMETALLIC COMPOUNDS**

(*SEMICONDUCTORS: *INTERMETALLIC COMPOUNDS: CRYSTALS: *SINGLE CRYSTALS: ALLOYS: *LEAD ALLOYS: *TELLURIUM ALLOYS: TELLURIDES.) (*PHASE STUDIES: TEMPERATURE: VAPOR PRESSURE: THERMODYNAMICS: THEORY.)
NAVAL ORDNANCE LAB.: WHITE OAK: MD.
AD-274 496 62-3-2 DIV. 17

(*INTERMETALLIC COMPOUNDS: SEMICONDUCTORS: CRYSTALS: SINGLE CRYSTALS: *THERMOELECTRICITY: *LEAD COMPOUNDS: BARIUM COMPOUNDS: TIN COMPOUNDS: *TELLURIDES: *SELENIDES: ELECTRICAL PROPERTIES: RESISTANCE: HALL EFFECT: PHASE STUDIES.) SOLID STATE PHYSICS: ELECTRONICS: ALLOYS.
NEW YORK U.: N. Y.
AD-274 498 62-3-2 DIV. 25

***INTERSTELLAR MATTER**

(*INTERSTELLAR MATTER: MAGNETIC FIELDS: TERRESTRIAL MAGNETISM: GRAVITY: SOLAR ENERGY: VAN ALLEN RADIATION BELTS: ULTRAVIOLET RADIATION: SUN.) (MOON: PLANETARY ATMOSPHERES: TERRAIN: GEOLOGY.) (MARS: VENUS: JUPITER: SATURN: URANUS: PLUTO.) (GALAXIES: STARS: SPECTROGRAPHIC ANALYSIS.) (*ASTRONOMY: *ASTROPHYSICS.) *PLANETS.
AIR FORCE CAMBRIDGE RESEARCH LABS.: BEDFORD, MASS.
AD-274 652 62-3-2 DIV. 2

***INVERTED RECTIFIERS**

(*RECTIFIERS: *INVERTED RECTIFIERS: SILICON: SEMICONDUCTORS: ELECTRIC TRIGGER CONTROLS: *INVERTER CIRCUITS: *SWITCHING CIRCUITS: TRIGGER CIRCUITS: TRIGGERED GATES: PULSE GENERATORS: RELAXATION OSCILLATORS: OSCILLATOR CIRCUITS: DESIGN: THEORY.) (TRANSFORMERS: INDUCTANCE: MAGNETIC CORES: MATHEMATICAL ANALYSIS.)
ORDNANCE RESEARCH LAB.: PENNSYLVANIA STATE U.: UNIVERSITY PARK.
AD-274 497 62-3-2 DIV. 7

***INVERTER CIRCUITS**

(*RECTIFIERS: *INVERTED RECTIFIERS: SILICON: SEMICONDUCTORS: ELECTRIC TRIGGER CONTROLS: *INVERTER CIRCUITS: *SWITCHING CIRCUITS: TRIGGER CIRCUITS: TRIGGERED GATES: PULSE GENERATORS: RELAXATION OSCILLATORS: OSCILLATOR CIRCUITS: DESIGN: THEORY.) (TRANSFORMERS: INDUCTANCE: MAGNETIC CORES: MATHEMATICAL ANALYSIS.)
ORDNANCE RESEARCH LAB.: PENNSYLVANIA STATE U.: UNIVERSITY PARK.
AD-274 497 62-3-2 DIV. 7

***IODIDES**

(PHOTOCHEMISTRY: PHOTOCHEMICAL REACTIONS: REACTION KINETICS: *PHOTOLYSIS OF HYDROCARBONS AND DEUTERATED COMPOUNDS CONTAINING *METHYL RADICALS: *ETHYL RADICALS: *IODIDES: LOW TEMPERATURE RESEARCH.) (PHOTONS: ABSORPTION AND *HYDROGEN ABSTRACTION: ENERGY DISSIPATION.) (SOLIDS: NITROGEN: KRYPTON: XENON.) INFRARED SPECTROSCOPY.
CALIFORNIA U.: BERKELEY.
AD-274 797 62-3-2 DIV. 4

***IONIC CURRENT**

(*GLOW DISCHARGES: *DISCHARGE TUBES: *IMPEDANCE: *IONIC CURRENT: TESTS: MEASUREMENT: MATHEMATICAL ANALYSIS.) (ARGON: ELECTRON TUBES: CATHODES (ELECTRON TUBES): IMPEDANCE BRIDGES: IONS: TEST EQUIPMENT.)
DIAMOND ORDNANCE FUZE LABS.: WASHINGTON: D. C.
AD-274 470 62-3-2 DIV. 8

***IONIZATION**

(*REACTION KINETICS: *DISSOCIATION: *RECOMBINATION REACTIONS: *GASES: IONS: MOLECULES DURING *IONIZATION: MOLECULAR ROTATION: VIBRATION: RELAXATION TIME AT HIGH TEMPERATURE RESEARCH: ENERGY TRANSFER EXCITATION: ATOMIC ENERGY LEVELS: THEORY.)
SHOCK WAVES: ATMOSPHERE ENTRY.
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING: ITHACA: N. Y.
AD-274 467 62-3-2 DIV. 4

***IONIZATION POTENTIALS**

(IONS: *DECABORANES: BORON COMPOUNDS: CHEMICAL BONDS: ISOTOPES: *IONIZATION POTENTIAL: MEASUREMENT: MASS SPECTROSCOPY.)
RIAS, INC.: BALTIMORE: MD.
AD-274 603 62-3-2 DIV. 4

***IONOSPHERE**

(INSTRUMENTATION OF *SATELLITE VEHICLES: SPACE PROBES FOR MEASUREMENT OF *IONOSPHERE: *SPACE ENVIRONMENTAL CONDITIONS INCLUDING PARTICLES: IONS: ELECTRONS: DENSITY: TEMPERATURE.) (*GEOPHYSICS: TERRESTRIAL MAGNETISM: PLASMA PHYSICS: TESTS.) (FLIGHT TESTING OF SATELLITE ATTITUDE: DETECTORS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION: WASHINGTON: D. C.
AD-274 563 62-3-2 DIV. 2

(*RADAR SIGNALS: RADAR PULSES: SCATTERING: *ATTENUATION: IONOSPHERIC PROPAGATION: *IONOSPHERE: TEMPERATURE: WAVE TRANSMISSION: *ELECTROMAGNETIC WAVE REFLECTIONS: INTEGRAL TRANSFORMS: SPECTROGRAPHIC ANALYSIS.)
CORNELL U.: ITHACA: N. Y.
AD-274 721 62-3-2 DIV. 8

(*IONOSPHERE: ELECTRONS: HEATING: *RADIO BEAMS.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 784 62-3-2 DIV. 2

***IONOSPHERIC DISTURBANCES**

(MILITARY OPERATIONS: *RADIO COMMUNICATION SYSTEMS: HIGH FREQUENCY: PROPAGATION: *SUNSPOTS: *IONOSPHERIC DISTURBANCES: NOISE (RADIO): STATISTICAL ANALYSIS.)
JANSKY AND BAILEY DIV.: ATLANTIC RESEARCH CORP.: *HEATON: MD.
AD-274 733 62-3-2 DIV. 9

***IONOSPHERIC PROPAGATION**

(*COMMUNICATIONS THEORY: *RADIO SIGNALS: *RADIO WAVES: WAVE TRANSMISSION: HIGH FREQUENCY: ATTENUATION: PROPAGATION: IONOSPHERE MODELS: ANALYSIS: THEORY.) (ELECTROMAGNETIC WAVES: POLARIZATION: PLASMA PHYSICS: *MAGNETO-OPTIC ROTATION: PHASE SHIFTERS: *IONOSPHERIC PROPAGATION: MEASUREMENT: TEST EQUIPMENT: TEST METHODS.)
PAGE COMMUNICATIONS ENGINEERS, INC.: WASHINGTON: D. C.
AD-274 682 62-3-2 DIV. 8

***IRREVERSIBLE PROCESSES**

(*THERMODYNAMICS: *IRREVERSIBLE PROCESSES: *FLUID MECHANICS: GASES: DIFFUSION: PRESSURE: PHYSICAL CHEMISTRY.) (*KINETIC THEORY: ENTROPY: GAS FLOW.) (*MATHEMATICAL ANALYSIS: PARTIAL DIFFERENTIAL EQUATIONS.)
FRANKFORD ARSENAL: PHILADELPHIA: PA.
AD-274 781 62-3-2 DIV. 9

***JET ENGINE FUELS**

(*JET ENGINE FUELS: GAS GENERATOR ENGINES: AIRCRAFT: SUPERSONIC PLANES: IGNITION: *COMBUSTION: FLAMES: EXHAUST GASES: FLUID FLOW: PHYSICAL PROPERTIES: STABILITY: TEST EQUIPMENT: COMBUSTION CHAMBERS: TEST METHODS: INFRARED SPECTROSCOPY.) (HYDROCARBONS: CYCLOHEXANES.)
SHELL OIL CO.: WOOD RIVER, ILL.
AD-274 620 62-3-2 DIV. 10

(*AVIATION FUELS: *JET ENGINE FUELS: *ROCKET FUELS: PHYSICAL PROPERTIES: CHEMICAL PROPERTIES: THERMODYNAMICS: HANDBOOKS.) (SOLUBILITY OF AIR: NITROGEN: ETHANES.) (HYDROCARBONS: NAPHTHALENES.) VISCOSITY: DENSITY: SPECIFIC HEAT: ENTHALPY: ENTROPY: VAPORIZATION.
INGLEWOOD LAB.: THOMPSON PRODUCTS, INC.: CALIF.
AD-274 623 62-3-2 DIV. 10

***JET PROPULSION**

(*FLUID MECHANICS: GASES: PARTICLES: MIXTURES: *GAS FLOW: GAS IONIZATION: MAGNETOHYDRODYNAMICS: *PLASMA PHYSICS: PLASMA JETS: THERMODYNAMICS: *REACTION KINETICS: KINETIC THEORY: CHEMICAL REACTIONS: SURFACES: CATALYSIS.) (ALUMINUM: SOLID ROCKET PROPELLANTS: *COMBUSTION: FLARES.) *JET PROPULSION: RECOMBINATION REACTIONS.
JAMES FORRESTAL RESEARCH CENTER: PRINCETON U.: N. J.
AD-274 748 62-3-2 DIV. 9

***JET STREAMS (METEOROLOGY)**

(WEATHER FORECASTING: *JET STREAMS (METEOROLOGY): NORTHERN HEMISPHERE.) (*WIND: METEOROLOGICAL DATA: SAMPLING.)
WISCONSIN U.: MADISON.
AD-274 773 62-3-2 DIV. 2

***JOURNAL BEARINGS**

(*GAS BEARINGS: AIR OR GASES: LUBRICATION: *JOURNAL BEARINGS: TESTS.) (VELOCITY: VECTOR ANALYSIS: MOTION: LOADING: HYSTERESIS.)
INTERNATIONAL BUSINESS MACHINES CORP.: SAN JOSE: CALIF.
AD-274 581 62-3-2 DIV. 9

***KINETIC THEORY**

(*THERMODYNAMICS: *IRREVERSIBLE PROCESSES: *FLUID MECHANICS: GASES: DIFFUSION: PRESSURE: PHYSICAL CHEMISTRY.) (*KINETIC THEORY: ENTROPY: GAS FLOW.) (*MATHEMATICAL ANALYSIS: PARTIAL DIFFERENTIAL EQUATIONS.)
FRANKFORD ARSENAL: PHILADELPHIA: PA.
AD-274 781 62-3-2 DIV. 9

(*KINETIC THEORY OF DISPERSION OF *SEMICONDUCTORS, LEAD COMPOUNDS, SULFIDES, ZINC COMPOUNDS, OXIDES IN CONCENTRATED NITRIC ACID AND AQUEOUS SOLUTIONS OF HYDROCHLORIC ACID.) (DOPING OF SILVER COMPOUNDS, SULFIDES, BISMUTH COMPOUNDS, NICKEL COMPOUNDS, ALUMINUM COMPOUNDS, LITHIUM COMPOUNDS.) CHEMICAL REACTIONS.
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 868 62-3-2 DIV. 8

***KLYSTRONS**

(*KLYSTRONS: TEST EQUIPMENT, *TEST FACILITIES, CONSTRUCTION.) (MODULATORS, *MODULATOR TUBES, PULSE GENERATORS, PULSE TRANSFORMERS, RESISTORS, TRANSMISSION LINES, POWER SUPPLIES, ELECTRONIC SWITCHES, ELECTRONIC CIRCUITS, SWITCHING CIRCUITS, DESIGN, PRODUCTION, TESTS.) (*TRIODES, MODULATOR TUBES.)
RADIATION, INC., PALO ALTO, CALIF.
AD-274 604 62-3-2 DIV. 30

***LAMINAR BOUNDARY LAYER**

(FLUID FLOW, CONDUCTIVITY, *LAMINAR BOUNDARY LAYER, PRESSURE.) (THERMODYNAMICS, MAGNETIC FIELDS, VELOCITY.)
JOHNS HOPKINS U., BALTIMORE, MD.
AD-274 666 62-3-2 DIV. 25

(*SUPERSONIC FLOW, *GASES, AIR AND FREON INJECTION INTO *LAMINAR BOUNDARY LAYER AND *TURBULENT BOUNDARY LAYER, PRESSURE MEASUREMENT AT MACH NUMBER.) (WIND TUNNELS, TESTS OF MODEL CONFIGURATIONS.)
CENTRE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, BRUSSELS (BELGIUM).
AD-274 762 62-3-2 DIV. 9

***LAMINATES**

(*COMPOSITE MATERIALS, *LAMINATES, PLASTICS, GLASS TEXTILES, FIBERS, REINFORCING MATERIALS, *RESINS, DEFORMATION, CRAZING, MATHEMATICAL ANALYSIS, STRESSES.)
NAVAL RESEARCH LAB., WASHINGTON, D. C.
AD-274 560 62-3-2 DIV. 14

(HIGH TEMPERATURE RESEARCH, *RADOMES, MATERIALS, REINFORCING MATERIALS, CERAMIC MATERIALS, CERAMIC FIBERS, ASBESTOS FIBER, MICA, ALUMINUM COMPOUNDS, PHOSPHATES, SILICON COMPOUNDS, DIOXIDES, GLASS, SPHERES, *LAMINATES, *BINDERS, FILAMENT WOUND CONSTRUCTION.) MECHANICAL PROPERTIES, DIELECTRIC PROPERTIES, VISCOSITY.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 732 62-3-2 DIV. 8

***LANDING IMPACT**

(*LANDING IMPACT, *PNEUMATIC DEVICES, IMPACT SHOCK, SHOCK RESISTANCE, SHOCK ATTENUATION, ABSORPTION.) (COMPRESSION SHOCK, SHOCK WAVES, FLUID MECHANICS, STRESSES, THEORY, MATHEMATICAL ANALYSIS.) (EQUATIONS OF MOTION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 588 62-3-2 DIV. 9

***LEAD ALLOYS**

(*SEMICONDUCTORS, *INTERMETALLIC COMPOUNDS, CRYSTALS, *SINGLE CRYSTALS, ALLOYS, *LEAD ALLOYS, *TELLURIUM ALLOYS, TELLURIDES.) (*PHASE STUDIES, TEMPERATURE, VAPOR PRESSURE, THERMODYNAMICS, THEORY.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 496 62-3-2 DIV. 17

***LEAD COMPOUNDS**

(*INTERMETALLIC COMPOUNDS, SEMICONDUCTORS, CRYSTALS, SINGLE CRYSTALS, *THERMOELECTRICITY, *LEAD COMPOUNDS, BARIUM COMPOUNDS, TIN COMPOUNDS, *TELLURIDES, *SELENIDES, ELECTRICAL PROPERTIES, RESISTANCE, HALL EFFECT, PHASE STUDIES.) SOLID STATE PHYSICS, ELECTRONICS, ALLOYS.
NEW YORK U., N. Y.
AD-274 498 62-3-2 DIV. 25

***LEADING EDGE FLAPS**

(*CANARD CONFIGURATION, AIRPLANES, *SPLIT FLAPS, *LEADING EDGE FLAPS, WIND TUNNEL MODELS, AERODYNAMICS, SUBSONIC FLOW, STABILITY (LATERAL), STABILITY (LONGITUDINAL), CONTROL, LIFT, EFFECTIVENESS, MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 380 62-3-2 DIV. 9

***LIMITERS**

(*RADAR SIGNALS, NOISE (RADAR), FUNCTIONAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES, *LIMITERS, BAND-PASS FILTERS, BROADBAND, NARROWBAND IN *RADAR RECEIVERS, SEARCH RADAR.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 684 62-3-2 DIV. 8

***LINEAR PROGRAMMING**

(*LINEAR PROGRAMMING, *STATISTICAL PROCESSES, SUPPLIES, COSTS, SCHEDULING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 593 62-3-2 DIV. 15

***LIQUID ROCKET PROPELLANTS**

(*LIQUID ROCKET PROPELLANTS, HANDLING, HAZARDS, TOXICITY, TOXIC AGENT ALARMS, DECONTAMINATION, DECONTAMINATION KITS, PROTECTIVE CLOTHING, TRAINING.) (HYDRAZINES, NITROGEN COMPOUNDS, OXIDES.)
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 474 62-3-2 DIV. 13

(*SATELLITE VEHICLES, *BOOSTER ROCKETS, FUEL SYSTEMS, *LIQUID ROCKET PROPELLANTS.) (*PROPELLANT TANKS, TEMPERATURE CONTROL, VENTILATION, SPACE ENVIRONMENTAL CONDITIONS, WEIGHTLESSNESS, ACCELERATION.) (ROCKET FUELS, ROCKET OXIDIZERS, SURFACE PROPERTIES, SURFACE TENSION.) GAS PRESSURIZATION SYSTEMS.
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 482 62-3-2 DIV. 27

***LOW FREQUENCY**

(*SCATTERING, *ELECTROMAGNETIC WAVES, *TARGETS, *LOW FREQUENCY.) (QUANTUM MECHANICS, PARTIAL DIFFERENTIAL EQUATIONS, POLYNOMIALS, METAMATHEMATICS, NONLINEAR SYSTEMS.)
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 528 62-3-2 DIV. 25

***LUMINESCENCE**

(EXCITATION BY *ELECTRON BOMBARDMENT OF SOLIDS, *NITROGEN CAUSING *LUMINESCENCE.) DIFFUSION THEORY, LOW TEMPERATURE RESEARCH.
CALIFORNIA U., BERKELEY.
AD-274 798 62-3-2 DIV. 20

***LUMINESCENT MATERIALS**

(*DISPLAY SYSTEMS, SOLID STATE PHYSICS, LUMINESCENCE, *LUMINESCENT MATERIALS.) (*ELECTRONIC SWITCHES, PLATINUM, PALLADIUM, IONIC CURRENT, LIFE EXPECTANCY, ELECTROSTRICTION, SWITCHES.) (RESISTORS, *FERROELECTRIC MATERIALS, SUPPRESSORS.) (SANDWICH CONSTRUCTION, LAMINATES.)
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
AD-274 630 62-3-2 DIV. 8

***MAGNETIC FIELDS**

(*MAGNETIC FIELDS, INTENSITY STUDIES ALONG THE AXIS OF *COILS, *SOLENOIDS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 570 62-3-2 DIV. 25

(*QUANTUM MECHANICS, NUCLEAR MAGNETIC RESONANCE, *RESONANCE.) (SPIN, DENSITY, OSCILLATION, *MAGNETIC FIELDS, DIFFERENTIAL EQUATIONS.) THESES.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 740 62-3-2 DIV. 25

***MAGNETIC PINCH**

(*PLASMA PHYSICS, PLASMA OSCILLATIONS, *MAGNETIC PINCH IN MAGNETIC FIELDS, GAS DISCHARGES.) (INSTRUMENTATION, OSCILLATORS, ELECTRON TUBES, DISCHARGE TUBES, PHOTOMULTIPLIERS.) (MEASUREMENT OF ELECTRONS, DENSITY, TEMPERATURE.) (SPECTROGRAPHIC ANALYSIS IN CONTINUOUS MEDIA.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 700 62-3-2 DIV. 25

***MAGNETIC SUSCEPTIBILITY**

(*ANTIFERROMAGNETISM, *MAGNETIC SUSCEPTIBILITY, MEASUREMENT.) (PARTICLES, *NUCLEAR SPINS, LATTICES, QUANTUM MECHANICS.) (OPERATORS (MATHEMATICS), TRANSFORMATIONS (MATHEMATICS), MATRIX ALGEBRA, LINEAR SYSTEMS.)
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
AD-274 471 62-3-2 DIV. 25

***MAGNETO-OPTIC ROTATION**

(*COMMUNICATIONS THEORY, *RADIO SIGNALS, *RADIO WAVES, WAVE TRANSMISSION, HIGH FREQUENCY, ATTENUATION, PROPAGATION, IONOSPHERE MODELS, ANALYSIS, THEORY.)
(ELECTROMAGNETIC WAVES, POLARIZATION, PLASMA PHYSICS, *MAGNETO-OPTIC ROTATION, PHASE SHIFTERS, *IONOSPHERIC PROPAGATION, MEASUREMENT, TEST EQUIPMENT, TEST METHODS.)
PAGE COMMUNICATIONS ENGINEERS, INC., WASHINGTON, D. C.
AD-274 682 62-3-2 DIV. 8

***MAGNETOHYDRODYNAMICS**

(*MAGNETOHYDRODYNAMICS, VORTEX GENERATORS, FEASIBILITY STUDIES, TESTS, DESIGN.) (ENERGY, TEMPERATURE, *HEAT TRANSFER, PRESSURE, ELECTRICAL CONDUCTANCE, GAS IONIZATION.) (TENSILE PROPERTIES OF TANTALUM.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 644 62-3-2 DIV. 25

(*MAGNETOHYDRODYNAMICS, DETONATION WAVES, ELECTRICITY, CONDUCTIVITY, GASES.) (MAGNETIC FIELDS, *PLASMA PHYSICS.) (HIGH TEMPERATURE RESEARCH, *THERMONUCLEAR REACTIONS, REACTION TIME, SHOCK.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 697 62-3-2 DIV. 25

(*MAGNETOHYDRODYNAMICS, MAGNETIC PINCH IN *DISCHARGE TUBES, PLASMA OSCILLATIONS.) (MEASUREMENT OF TURBULENCE IN MAGNETIC FIELDS BY OSCILLOSCOPE PROBES.) (INSTRUMENTATION, PHOTOGRAPHIC ANALYSIS, OSCILLOSCOPES, PHOTOGRAPHS.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 699 62-3-2 DIV. 25

***MANAGEMENT ENGINEERING**

(COMMUNICATION SYSTEMS, ANALYSIS, PROBABILITY, *COMBINATORIAL ANALYSIS, *COMPLEX VARIABLES, *SCHEDULING, *MANAGEMENT ENGINEERING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 597 62-3-2 DIV. 5

***MANUFACTURING METHODS**

(*DIODES, TRANSISTORS, *SEMICONDUCTORS, DESIGN, *MANUFACTURING METHODS.) (CRYSTALS, *SINGLE CRYSTALS, LATTICES, GROWTH, THIN FILMS, SILICON, DEPOSITS, THICKNESS.) (CHEMICAL IMPURITIES, CONTROL, DETERMINATION, DIFFUSION.) (THIN FILMS, MEASUREMENT BY INFRARED SPECTROSCOPY.)
SYLVANIA ELECTRIC PRODUCTS, INC., WOBURN, MASS.
AD-274 621 62-3-2 DIV. 8

(*MATERIALS FOR SPACESHIPS, AIRCRAFT, *MANUFACTURING METHODS, PROCESSING, *TRANSFORMATIONS, PHASE TRANSITIONS, FEASIBILITY STUDIES.) (ABRASION, BONDING (SOLID STATE), CHEMICAL MILLING, DRAWING (MACHINE PROCESSING), SINTERING, ULTRASONICS, MELTING, WELDING, RADIATION EFFECTS, MACHINING.) (SOLIDS, REFRACTORY MATERIALS, CERAMIC MATERIALS, CRYSTALS.) (TEMPERATURE, PRESSURE, ELECTRIC FIELDS, MAGNETIC FIELDS.)
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 651 62-3-2 DIV. 26

(*ELECTROLYTIC CAPACITORS, *TANTALUM CAPACITORS, DESIGN, *MANUFACTURING METHODS, ANODES (ELECTROLYTIC CELL), SINTERING.) (SURFACE PROPERTIES, MANGANESE COMPOUNDS, OXIDES, DIOXIDES, CHEMICAL IMPURITIES, PROCESSING, TESTS.) (ANODES (ELECTROLYTIC CELL), TANTALUM, FOAMED METALS, ELECTRICAL PROPERTIES, CHEMICAL ANALYSIS.)
GENERAL ELECTRIC CO., IRMO, SOUTH CAROLINA.
AD-274 733 62-3-2 DIV. 8

(*TRANSISTORS, SILICON, HIGH FREQUENCY, *SEMICONDUCTORS, *MANUFACTURING METHODS, PRODUCTION, PROCESSING.) (CRYSTALS, SILICON, CHEMICAL IMPURITIES, DIFFUSION, ETHYL RADICALS, SILICATES, PROPYL RADICALS, BORATES, PHOSPHORUS COMPOUNDS, OXYCHLORIDES, INDUCTANCE.) *PACKAGED CIRCUITS, DESIGN, THEORY.
PACIFIC SEMICONDUCTORS, INC., LAWNDALE, CALIF.
AD-274 833 62-3-2 DIV. 8

(AUDIOFREQUENCY, *TRANSISTORS FOR TRANSISTOR AMPLIFIERS, *AUDIO AMPLIFIERS, AMPLIFIERS, DESIGN, *MANUFACTURING METHODS, AUTOMATIC, PRODUCTION, GERMANIUM, PROCESSING, MATERIALS, ALLOYS, ELECTRICAL PROPERTIES, SURFACES, ENCAPSULATION, TEST EQUIPMENT, RELIABILITY, MECHANICAL PROPERTIES.)
WESTERN ELECTRIC CO., LAURELDALE, PA.
AD-274 847 62-3-2 DIV. 8

***MAPPING**

(TESTS OF OPTICAL INSTRUMENTS INCLUDING *STEREOSCOPIC MAP PLOTTERS FOR *MAPPING FROM AERIAL PHOTOGRAPHS.)
SYRACUSE U. RESEARCH INST., N. Y.
AD-274 613 62-3-2 DIV. 24

***MARTENSITE**

(ALLOYS, METALS, *CRYSTAL STRUCTURE, LATTICES, DEFORMATION, X-RAY DIFFRACTION ANALYSIS, *TANTALUM, *NIOBIUM, *MARTENSITE, STAINLESS STEEL (16 CR-12 NI),)
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 640 62-3-2 DIV. 17

***MASERS**

(INFRARED DETECTORS, *MASERS,)
(CRYOSTATS, *SUPERCONDUCTIVITY, SUPERCONDUCTORS, ELECTROMAGNETS,) *THIN FILMS,
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 703 62-3-2 DIV. 25

(*LASERS, HELIUM, NEON, EXCITATION, *OPTICS, *MASERS,) (RARE GASES, DIFFUSION, ELECTRONS, DENSITY,)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 705 62-3-2 DIV. 8

*BIBLIOGRAPHY, *MASERS, *LASERS, LIGHT, AMPLIFIERS, MICROWAVE AMPLIFIERS,
SPACE TECHNOLOGY LABS., INC., REDONDO BEACH, CALIF.
AD-274 843 62-3-2 DIV. 25

***MATERIALS**

(*MATERIALS FOR SPACESHIPS, AIRCRAFT, *MANUFACTURING METHODS, PROCESSING, *TRANSFORMATIONS, PHASE TRANSITIONS, FEASIBILITY STUDIES,) (ABRASION, BONDING (SOLID STATE), CHEMICAL MILLING, DRAWING (MACHINE PROCESSING), SINTERING, ULTRASONICS, MELTING, WELDING, RADIATION EFFECTS, MACHINING,) (SOLIDS, REFRACTORY MATERIALS, CERAMIC MATERIALS, CRYSTALS,) (TEMPERATURE, PRESSURE, ELECTRIC FIELDS, MAGNETIC FIELDS,)
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 651 62-3-2 DIV. 26

***MATHEMATICAL ANALYSIS**

(*THERMODYNAMICS, *IRREVERSIBLE PROCESSES, *FLUID MECHANICS, GASES, DIFFUSION, PRESSURE, PHYSICAL CHEMISTRY,) (*KINETIC THEORY, ENTROPY, GAS FLOW,) (*MATHEMATICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS,)
FRANKFORD ARSENAL, PHILADELPHIA, PA.
AD-274 781 62-3-2 DIV. 9

***MATRIX ALGEBRA**

(DATA PROCESSING SYSTEMS, *CYBERNETICS, AUTOMATION, COMPUTERS,) (MATHEMATICAL PREDICTION, *MATRIX ALGEBRA, COMPLEX VARIABLES, INTEGRAL EQUATIONS,)
SYSTEMS RESEARCH CENTER, CASE INST. OF TECH., CLEVELAND, OHIO.
AD-274 802 62-3-2 DIV. 30

(*MATRIX ALGEBRA, SEQUENCES, VECTOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS),)
RAND CORP., SANTA MONICA, CALIF.
AD-274 836 62-3-2 DIV. 15

***MECHANICS**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY, THEORY OF *SOLIDS,) (*MECHANICS, SHEAR STRESSES, LOAD DISTRIBUTION, DEFORMATION, DYNAMICS, POTENTIAL THEORY, KINETIC THEORY,) (*SOLID STATE PHYSICS, CRYSTALS, METALLIC CRYSTALS,)
LABORATORY FOR INSULATION RESEARCH, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

***METAL COATINGS**

(*ALLOYS, *METALS, *CERAMIC COATINGS, *CERAMIC MATERIALS, THERMAL RADIATION, REFLECTION, ABSORPTION, BLACKBODY RADIATION, SPECTROGRAPHIC ANALYSIS, SPECTROPHOTOMETERS, SPECTROGRAPHIC DATA, ULTRAVIOLET RADIATION, LIGHT, INFRARED RADIATION, *PHOTOEMISSION,) (CHROMIUM ALLOYS, NICKEL ALLOYS, STEEL, COBALT ALLOYS,) (BERYLLIUM, NIOBIUM, TANTALUM, TITANIUM, TUNGSTEN, VANADIUM, *METAL COATINGS,) (BORON COMPOUNDS, CARBIDES, TANTALUM COMPOUNDS, ZIRCONIUM COMPOUNDS, OXIDES, MOLYBDENUM COMPOUNDS, SILICIDES,) (TUNGSTEN ALLOYS, STAINLESS STEEL, TITANIUM ALLOYS, MOLYBDENUM ALLOYS, IRON ALLOYS,)
NORTHROP CORP., HAWTHORNE, CALIF.
AD-274 538 62-3-2 DIV. 17

***METALORGANIC COMPOUNDS**

(*METALORGANIC COMPOUNDS, *ALUMINUM COMPOUNDS, *METHYL RADICALS, SYNTHESIS, CHEMICAL REACTIONS, OXIDATION, DISPLACEMENT REACTIONS, CHEMICAL BONDS,) (HYDRIDES, NITROGEN COMPOUNDS, AZIDES, PHENYL RADICALS, CHLORIDES,) (THEORY, MOLECULAR STRUCTURE, INFRARED SPECTROSCOPY, CALORIMETERS, THERMODYNAMICS,)
NEW YORK U., N. Y.
AD-274 499 62-3-2 DIV. 4

***METALS**

(*ALLOYS, *METALS, *CERAMIC COATINGS, *CERAMIC MATERIALS, THERMAL RADIATION, REFLECTION, ABSORPTION, BLACKBODY RADIATION, SPECTROGRAPHIC ANALYSIS, SPECTROPHOTOMETERS, SPECTROGRAPHIC DATA, ULTRAVIOLET RADIATION, LIGHT, INFRARED RADIATION, *PHOTOEMISSION,) (CHROMIUM ALLOYS, NICKEL ALLOYS, STEEL, COBALT ALLOYS,) (BERYLLIUM, NIOBIUM, TANTALUM, TITANIUM, TUNGSTEN, VANADIUM, *METAL COATINGS,) (BORON COMPOUNDS, CARBIDES, TANTALUM COMPOUNDS, ZIRCONIUM COMPOUNDS, OXIDES, MOLYBDENUM COMPOUNDS, SILICIDES,) (TUNGSTEN ALLOYS, STAINLESS STEEL, TITANIUM ALLOYS, MOLYBDENUM ALLOYS, IRON ALLOYS,)
NORTHROP CORP., HAWTHORNE, CALIF.
AD-274 538 62-3-2 DIV. 17

(ALLOYS, *METALS, IRON ALLOYS, TITANIUM ALLOYS, VANADIUM ALLOYS, ZIRCONIUM ALLOYS, SOLUTIONS, *SPECTROGRAPHIC ANALYSIS, TEST METHODS,)
WATERTOWN ARSENAL LABS., MASS.
AD-274 637 62-3-2 DIV. 4

(*BIBLIOGRAPHY, *METALS, *HEAT RESISTANT ALLOYS, *CERAMIC MATERIALS, *REFRACTORY MATERIALS, ALLOYS,) (STEEL, STAINLESS STEEL, IRON ALLOYS, NICKEL ALLOYS, BERYLLIUM, TITANIUM, MAGNESIUM, NIOBIUM, CHROMIUM, MOLYBDENUM, TANTALUM, VANADIUM, TUNGSTEN,)
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
AD-274 649 62-3-2 DIV. 17

(*METALS, *STRUCTURES, *FATIGUE (MECHANICS), STRESSES, DEFORMATION,) (ALUMINUM ALLOYS (7075-T6), STAINLESS STEEL (301-A-286), TITANIUM ALLOYS (8AL-1MO-1V),) (METAL JOINTS, RIVETED JOINTS,) PHOTOELASTICITY,
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
AD-274 656 62-3-2 DIV. 25

(CONFERENCES, THERMAL INSULATION, *REFRACTORY MATERIALS, *COMPOSITE MATERIALS,) (*CERAMIC MATERIALS, REFRACTORY COATINGS, CERAMIC COATINGS, METAL COATINGS, COATINGS, CERMETS, GRAPHITE, *METALS, MOLYBDENUM, NIOBIUM, TANTALUM, TUNGSTEN, VANADIUM, VANADIUM ALLOYS, MOLYBDENUM ALLOYS, NIOBIUM ALLOYS, TANTALUM ALLOYS, TUNGSTEN ALLOYS,) (REINFORCING MATERIALS, FIBERS, SINGLE CRYSTALS, CERAMIC FIBERS,) (GUIDED MISSILE NOSES, ROCKET MOTOR NOZZLES, ROCKET NOSES, RE-ENTRY VEHICLES,) ALLOYS, FLAME SPRAYING, PLASMA JETS, ABLATION, DISPERSION HARDENING,
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
AD-274 804 62-3-2 DIV. 14

***METEOROLOGICAL CHARTS**

(*STRATOSPHERE, WIND, TEMPERATURE, PERIODIC VARIATIONS, *METEOROLOGICAL CHARTS,)
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 487 62-3-2 DIV. 2

***METEORS**

(DENSITY OF *RADAR REFLECTIONS, *RADAR ECHO AREAS FROM *METEORS,) ITALY, FLORENCE U. (ITALY).
AD-274 468 62-3-2 DIV. 6

(*METEORS, EXOSPHERE, UPPER ATMOSPHERE, GRAVITY,)
RAND CORP., SANTA MONICA, CALIF.
AD-274 594 62-3-2 DIV. 2

***METHANOLS**

(SOLUTIONS, *METHANOL, WATER, RADIATION EFFECTS, GAMMA RAYS, INHIBITION, CHEMICAL REACTIONS, PRODUCTION, ETHYLENES, GLYCOLS, NITROGEN COMPOUNDS, OXIDES, ADDITIVES, BENZENES,)
CHICAGO U., ILL.
AD-274 539 62-3-2 DIV. 4

***METHYL RADICALS**

(PHOTOCHEMISTRY, PHOTOCHEMICAL REACTIONS, REACTION KINETICS, *PHOTOLYSIS OF HYDROCARBONS AND DEUTERATED COMPOUNDS CONTAINING *METHYL RADICALS, *ETHYL RADICALS, *IODIDES, LOW TEMPERATURE RESEARCH,) (PHOTONS, ABSORPTION AND *HYDROGEN ABSTRACTION, ENERGY DISSIPATION,) (SOLIDS, NITROGEN, KRYPTON, XENON,) INFRARED SPECTROSCOPY,
CALIFORNIA U., BERKELEY.
AD-274 797 62-3-2 DIV. 4

***MICROWAVE AMPLIFIERS**

(*MICROWAVES, PROPAGATION, ELECTROMAGNETIC WAVES, *PLASMA PHYSICS, ELECTRON BEAMS, CESIUM, ELECTRIC FIELDS, NOISE (RADIO), NONLINEAR SYSTEMS, THEORY,) (*MICROWAVE EQUIPMENT, *PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, *ELECTRON TUBES, CATHODES (ELECTRON TUBES), ELECTROMAGNETS, FREQUENCY MULTIPLIERS, DESIGN, TESTS,)
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 557 62-3-2 DIV. 8

(*PARAMETRIC AMPLIFIERS, SOLID STATE PHYSICS, C BAND, BROADBAND, DESIGN, TESTS,) (*MICROWAVE AMPLIFIERS, *ELECTRONIC CIRCUITS, TUNED CIRCUITS, TUNING CIRCUITS, DIODES, SILICON, PACKAGING, RESONANCE, THEORY, MATHEMATICAL ANALYSIS,) (*TUNED AMPLIFIERS, BACKWARD-WAVE OSCILLATORS,)
MICROMEGA CORP., VENICE, CALIF.
AD-274 619 62-3-2 DIV. 8

(*MICROWAVE AMPLIFIERS, *TRAVELLING WAVE TUBES, EXTREMELY HIGH FREQUENCY, SIGNAL-TO-NOISE RATIO, NOISE (RADIO), REDUCTION, *BAND-PASS FILTERS, TUNING DEVICES, YTTRIUM, GARNET,) (CATHODES (ELECTRON TUBES), MINIATURE ELECTRONIC EQUIPMENT, MANUFACTURING METHODS, TANTALUM,) (CATHODES (ELECTRON TUBES), HEATING, ANODES, HELIXES, STANDING WAVE RATIOS, FREQUENCY SHIFT, SENSITIVITY, MAGNETS, FOCUSING, TESTS,)
WATKINS-JOHNSON CO., PALO ALTO, CALIF.
AD-274 639 62-3-2 DIV. 8

(*PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, BROADBAND, NARROWBAND, X BAND, K BAND, ELECTRONIC CIRCUITS, FEASIBILITY STUDIES, DESIGN, THEORY,) (*COUPLING CIRCUITS, CYCLOTRONS, WAVE TRANSMISSION, PROPAGATION, HELIXES, IMPEDANCE, ELECTRON GUNS, MAGNETIC FIELDS, SPACE CHARGES, *ELECTRON BEAMS, TESTS,)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 845 62-3-2 DIV. 8

***MICROWAVE COMMUNICATION SYSTEMS**

(*COMMUNICATION SYSTEMS, TESTS, *STANDARDS, DESIGN, THEORY, TEST METHODS,) (*WAVE TRANSMISSION, RADIO WAVES, SCATTERING BY IONOSPHERE, ATMOSPHERE AND METEORS, VERY LOW FREQUENCY, IONOSPHERIC PROPAGATION, TRANSMISSION LINES, RADIOFREQUENCY CABLES, SATELLITE VEHICLES, RADIO TRANSMISSION, MICROWAVE RELAY SYSTEMS, RADIO RELAY SYSTEMS,) (*RADIO COMMUNICATION SYSTEMS, *MICROWAVE COMMUNICATION SYSTEMS, COMMUNICATION EQUIPMENT, COSTS, MATHEMATICAL ANALYSIS, SPECIFICATIONS,) RELIABILITY,
MINNEAPOLIS-HONEYWELL REGULATOR CO., SEATTLE, WASH.
AD-274 545 62-3-2 DIV. 5

***MICROWAVE EQUIPMENT**

(*POWER DIVIDERS, *WAVEGUIDE COUPLERS, *MICROWAVE EQUIPMENT, WAVEGUIDE JOINTS, THEORY, DESIGN,) (*WAVEGUIDES, *COAXIAL CABLES, IMPEDANCE MATCHING, PHASE MEASUREMENT,) ANTENNAS,
MERRIMAC RESEARCH AND DEVELOPMENT, INC., IRVINGTON, N. J.
AD-274 493 62-3-2 DIV. 8

(*MICROWAVES, PROPAGATION, ELECTROMAGNETIC WAVES, *PLASMA PHYSICS, ELECTRON BEAMS, CESIUM, ELECTRIC FIELDS, NOISE (RADIO), NONLINEAR SYSTEMS, THEORY,) (*MICROWAVE EQUIPMENT, *PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, *ELECTRON TUBES, CATHODES (ELECTRON TUBES), ELECTROMAGNETS, FREQUENCY MULTIPLIERS, DESIGN, TESTS,)
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 557 62-3-2 DIV. 8

(*TRANSMISSION LINES, MICROWAVES, S BAND, *RADIOFREQUENCY POWER, DESIGN,) (*WAVEGUIDES, MICROWAVE FREQUENCY, RADAR DUPLEXERS, WAVEGUIDE COUPLERS, WAVEGUIDE WINDOWS, *MICROWAVE EQUIPMENT, GASES, PRESSURE, TEMPERATURE, COOLING BY CONVECTION, WAVEGUIDE FILTERS, SURFACE PROPERTIES, ANALYSIS,) (PROPAGATION, WAVE TRANSMISSION, ATTENUATION, ABSORPTION,)
MICROWAVE RESEARCH ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 819 62-3-2 DIV. 8

(*TRANSMISSION LINES, MICROWAVES, S BAND, *RADIOFREQUENCY POWER, DESIGN,) (*WAVEGUIDES, MICROWAVE FREQUENCY, CAVITY RESONATORS, *MICROWAVE EQUIPMENT, WAVEGUIDE COUPLERS, WAVEGUIDE IRISES, TEMPERATURE, PRESSURE, COOLING, FINS, CONVECTION, LIQUID COOLED, WAVEGUIDE FILTERS, HEAT TRANSFER, COOLANT, COOLANT PUMPS, HEAT EXCHANGERS,)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 820 62-3-2 DIV. 8

***MICROWAVE RELAY SYSTEMS**

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS, NEW YORK.
AD-274 840 62-3-2 DIV. 5

***MICROWAVES**

(*MICROWAVES; EXTREMELY HIGH FREQUENCY; ANALYSIS; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; SPECTROGRAPHIC ANALYSIS; REFLECTORS; CIRCUITS; SHEETS.) (INSTRUMENTATION; AMPLIFIERS; MODULATORS; DISCRIMINATORS; KLYSTRONS; FREQUENCY MULTIPLIERS; HARMONIC ANALYZERS.) (OPTICS; WAVEGUIDES; DESIGN; RADIO RECEIVERS; ANTENNAS.) (FERMITES; DETECTORS; POWER SUPPLIES.)
ELECTRONIC COMMUNICATIONS, INC., TIMONIUM, MD.
AD-274 543 62-3-2 DIV. 8

(*MICROWAVES; PROPAGATION; ELECTROMAGNETIC WAVES; *PLASMA PHYSICS; ELECTRON BEAMS; CESIUM; ELECTRIC FIELDS; NOISE (RADIO); NONLINEAR SYSTEMS; THEORY.) (*MICROWAVE EQUIPMENT; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTROMAGNETS; FREQUENCY MULTIPLIERS; DESIGN; TESTS.)
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 557 62-3-2 DIV. 8

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U. (ITALY).
AD-274 728 62-3-2 DIV. 25

(*WAVEGUIDES; C BAND; K BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (*WAVEGUIDE JOINTS; *WAVEGUIDE COUPLERS; *WAVEGUIDE WINDOWS; *CAVITY RESONATORS; FREQUENCY SHIFT; TUNING DEVICES; ELECTRIC FIELDS; MAGNETRONS; *RADIOFREQUENCY POWER; PRESSURE; GASES; AIR; MEASUREMENT; *MICROWAVES; TEMPERATURE; TEST EQUIPMENT; *HANDBOOKS.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 822 62-3-2 DIV. 8

***MINING ENGINEERING**

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***MODULATOR TUBES**

(*KLYSTRONS; TEST EQUIPMENT; *TEST FACILITIES; CONSTRUCTION.) (MODULATORS; *MODULATOR TUBES; PULSE GENERATORS; PULSE TRANSFORMERS; RESISTORS; TRANSMISSION LINES; POWER SUPPLIES; ELECTRONIC SWITCHES; ELECTRONIC CIRCUITS; SWITCHING CIRCUITS; DESIGN; PRODUCTION; TESTS.) (*TRIODES; MODULATOR TUBES.)
RADIATION, INC., PALO ALTO, CALIF.
AD-274 604 62-3-2 DIV. 30

***MODULATORS**

(*VOICE COMMUNICATION SYSTEMS; PHASE MODULATION; MODULATORS; DETECTORS; MODEL TESTS; DESIGN.) (COMMUNICATION SYSTEMS; TELEPHONE LINES; TELEPHONE COMMUNICATION SYSTEMS; DIGITAL SYSTEMS; DATA TRANSMISSION SYSTEMS; DATA PROCESSING SYSTEMS; COMPUTER LOGIC; CODING.) (ELECTRONIC CIRCUITS; SWITCHING CIRCUITS; TIMING CIRCUITS; PULSE TRANSMITTERS; PULSE INTEGRATORS.)
INTERNATIONAL BUSINESS MACHINES CORP., ROCKVILLE, MD.
AD-274 660 62-3-2 DIV. 9

***MOLECULES**

(*HYDROGEN; *MOLECULES; ATOMS; *QUANTUM MECHANICS; ATOMIC ORBITALS; NUCLEAR SPINS; ENERGY; *NUCLEAR SHELL MODELS; THEORY; *NUCLEAR ENERGY LEVELS.)
THEORETICAL CHEMISTRY LAB., U. OF WISCONSIN, MADISON.
AD-274 631 62-3-2 DIV. 25

***MOLYBDENUM ALLOYS**

(HIGH TEMPERATURE RESEARCH (2300 TO 6400 F); TUNGSTEN; *TUNGSTEN ALLOYS; *MOLYBDENUM ALLOYS (10; 25; 50 WT-%); TENSILE PROPERTIES; STRESSES; RUPTURE.) ROCKET MOTORS; MATERIALS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 567 62-3-2 DIV. 17

(PRODUCTION; *MOLYBDENUM ALLOYS; TITANIUM ALLOYS; SHEETS; *POWDER METALLURGY; CONTROLLED ATMOSPHERES; VACUUM FURNACES; *SINTERING.) (ADDITIVES; CARBON; HYDROGEN; NITROGEN; OXYGEN; HEAT TREATMENT; HARDENING; DISPERSION HARDENING; TITANIUM COMPOUNDS; CARBIDES; NITRIDES; OXIDES.) (ALLOYS; HEAT RESISTANT ALLOYS; POWDER ALLOYS; POWDER METALS; HARDNESS; MICROSTRUCTURE; TENSILE PROPERTIES; PROCESSING.)
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
AD-274 611 62-3-2 DIV. 17

***MOON**

(*MOON; TERRAIN; *RADAR ANALYSIS.) (RADAR ECHO AREAS; RADAR REFLECTIONS.) (RADAR EQUIPMENT; INTEGRATORS.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 669 62-3-2 DIV. 6

***MULTIPLEX TRANSMISSION**

(DESIGN; THEORY; *WAVEGUIDE FILTERS; *WAVEGUIDE JOINTS FOR *MULTIPLEX TRANSMISSION; MULTIPLE OPERATION; RADIO TRANSMITTERS; RADIO RECEIVERS; RADAR TRANSMITTERS; RADAR RECEIVERS; ULTRA HIGH FREQUENCY; SUPERHIGH FREQUENCY; MICROWAVE FREQUENCY.) SWITCHING CIRCUITS; COAXIAL FILTERS; *POWER DIVIDERS; WAVEGUIDE COUPLERS; TRANSMISSION LINES; MATHEMATICAL ANALYSIS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 524 62-3-2 DIV. 8

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS, NEW YORK.
AD-274 840 62-3-2 DIV. 5

***NEUTRON CROSS SECTIONS**

(*NUMERICAL METHODS AND PROCEDURES; STATISTICAL ANALYSIS; *PROBABILITY.) (COMPUTERS; *COMPUTER LOGIC; CODING.) (*NEUTRON SCATTERING; LATTICES; RESONANCE; ABSORPTION; ENERGY.) (NEUTRON CROSS SECTIONS FOR TUNGSTEN AND GOLD.) (RESEARCH REACTORS MODIFIED BY WATER; BERYLLIUM COMPOUNDS; OXIDES; LITHIUM COMPOUNDS; HYDRIDES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 572 62-3-2 DIV. 20

***NEUTRON SCATTERING**

(*NUMERICAL METHODS AND PROCEDURES; STATISTICAL ANALYSIS; *PROBABILITY.) (COMPUTERS; *COMPUTER LOGIC; CODING.) (*NEUTRON SCATTERING; LATTICES; RESONANCE; ABSORPTION; ENERGY.) (NEUTRON CROSS SECTIONS FOR TUNGSTEN AND GOLD.) (RESEARCH REACTORS MODIFIED BY WATER; BERYLLIUM COMPOUNDS; OXIDES; LITHIUM COMPOUNDS; HYDRIDES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 572 62-3-2 DIV. 20

***NIOBIUM**

(ALLOYS; METALS; *CRYSTAL STRUCTURE; LATTICES; DEFORMATION; X-RAY DIFFRACTION ANALYSIS; *TANTALUM; *NIOBIUM; *MARTENSITE; STAINLESS STEEL (16 CR-12 NI).)
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 640 62-3-2 DIV. 17

***NITRIDES**

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION.) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS.) (*THORIUM COMPOUNDS; OXIDES.) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS.)
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
AD-274 654 62-3-2 DIV. 14

***NITROGEN**

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U. (ITALY).
AD-274 728 62-3-2 DIV. 25

(EXCITATION BY *ELECTRON BOMBARDMENT OF SOLIDS; *NITROGEN CAUSING *LUMINESCENCE.) DIFFUSION THEORY; LOW TEMPERATURE RESEARCH.
CALIFORNIA U., BERKELEY.
AD-274 798 62-3-2 DIV. 20

***NITROGEN COMPOUNDS**

(*HEAT RESISTANT POLYMERS; *ELASTOMERS; *SILICON COMPOUNDS; *NITROGEN COMPOUNDS; SYNTHESIS.) (POLYMERS; CHLORINE COMPOUNDS; METHYL RADICALS; PHENYL RADICALS; SILANES; AZO RADICALS; CYCLOPENTANES; CYCLOHEXANES; PROPYL RADICALS; AMINES.) (POLYMERIZATION; MOLECULAR STRUCTURE; VISCOSITY; MOLECULAR WEIGHT.) INFRARED SPECTROSCOPY; CHEMICAL ANALYSIS.
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 489 62-3-2 DIV. 4

(*POLYMERS; *ELASTOMERS; *SILICON COMPOUNDS; *NITROGEN COMPOUNDS; *AMINES; AZO RADICALS; SYNTHESIS; *POLYMERIZATION; CHEMICAL REACTIONS.) (STABILITY; TEMPERATURE; HYDROLYSIS.) (METHYL RADICALS; SILICONES; HETEROCYCLIC COMPOUNDS; ETHYL RADICALS; PHENYL RADICALS; OXYGEN COMPOUNDS; VINYL RADICALS; CHLORIDES.)
HALLINCKROOT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 520 62-3-2 DIV. 4

***NOISE**

(*PHOTOELECTRIC CELLS; INDIUM COMPOUNDS; ANTIMONIDES; *NOISE; PHOTOCONDUCTIVITY.) (LOW TEMPERATURE RESEARCH; LIQUEFIED GASES; NITROGEN.)
E. M. I. ELECTRONICS, LTD. (GT. BRIT.).
AD-274 473 62-3-2 DIV. 25

(ANALYSIS OF INTERACTION BETWEEN *ELECTRON BEAMS AND TRANSVERSE ELECTROMAGNETIC FIELDS AND THE VELOCITY OF *NOISE; EXCITATION.) (EMISSION OF ELECTRONS FROM CATHODES.)
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT.
AD-274 829 62-3-2 DIV. 25

***NOISE (RADIO)**

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***NON-LINEAR DIFFERENTIAL EQUATIONS**

(*PLASMA PHYSICS; MECHANICAL PROPERTIES; *NON-LINEAR DIFFERENTIAL EQUATIONS; MAGNETIC FIELDS; ELECTROMAGNETIC EFFECTS; SOLAR ENERGY.) (*ENTROPY; PARTICLES; DISTRIBUTION THEORY.) *PLASMA OSCILLATIONS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 758 62-3-2 DIV. 25

***NOZZLES**

(*COMPRESSIBLE FLOW; FLUIDS; *NOZZLES; MAGNETOHYDRODYNAMICS.) (GAS FLOW; ACCELERATION; DECELERATION; THRUST; VELOCITY; PRESSURE; TEMPERATURE.) (PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS.)
DOUGLAS AIRCRAFT CO., INC., SANTA MONICA, CALIF.
AD-274 803 62-3-2 DIV. 9

***NUCLEAR ENERGY LEVELS**

(*HYDROGEN; *MOLECULES; ATOMS; *QUANTUM MECHANICS; ATOMIC ORBITALS; NUCLEAR SPINS; ENERGY; *NUCLEAR SHELL MODELS; THEORY; *NUCLEAR ENERGY LEVELS.)
THEORETICAL CHEMISTRY LAB., U. OF WISCONSIN, MADISON.
AD-274 631 62-3-2 DIV. 25

(*NUCLEAR PHYSICS, *ELECTROMAGNETIC FIELDS, *NUCLEAR ENERGY LEVELS, *NUCLEI, EXCITATION, *GAMMA RAYS, THEORY, PROBABILITY OF NUCLEAR MODELS.) (ELECTRONS, PHOTONS, ISOTOPES, RADIOACTIVITY.) (OXYGEN, CALCIUM, ZIRCONIUM, FLUORINE, STRONTIUM.)
STRASBOURG U. (FRANCE).
AD-274 739 62-3-2 DIV. 20

***NUCLEAR MAGNETIC RESONANCE**

(*NUCLEAR MAGNETIC RESONANCE, *RADIOFREQUENCY SPECTRUM ANALYZERS, DESIGN.) (OSCILLATORS, COILS, ELECTRONIC CIRCUITS, NARROWBAND, AMPLIFIERS AND LOCK-IN DETECTORS, MODULATORS, POWER SUPPLIES, STORAGE BATTERIES, DIRECT CURRENT.) SIGNAL-TO-NOISE RATIO.
MALLINCKRODT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 519 62-3-2 DIV. 20

***NUCLEAR PHYSICS**

(*NUCLEAR PHYSICS, *ELECTROMAGNETIC FIELDS, *NUCLEAR ENERGY LEVELS, *NUCLEI, EXCITATION, *GAMMA RAYS, THEORY, PROBABILITY OF NUCLEAR MODELS.) (ELECTRONS, PHOTONS, ISOTOPES, RADIOACTIVITY.) (OXYGEN, CALCIUM, ZIRCONIUM, FLUORINE, STRONTIUM.)
STRASBOURG U. (FRANCE).
AD-274 739 62-3-2 DIV. 20

(*NUCLEONS, SCATTERING, THEORY AND *PIONS, RESONANCE.) (NUMERICAL ANALYSIS, MATRIX ALGEBRA, SERIES, GREEN'S FUNCTION, INTEGRAL EQUATIONS, INTEGRAL TRANSFORMS.) (*NUCLEAR PHYSICS, PHASE STUDIES.)
MARYLAND U., COLLEGE PARK.
AD-274 818 62-3-2 DIV. 20

***NUCLEAR POWER PLANTS**

(MATHEMATICAL PREDICTION, PROBABILITY, RELIABILITY, *NUCLEAR POWER PLANTS, GENERATORS.) (*DIGITAL COMPUTERS, COMPUTER LOGIC, PROGRAMMING.)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 488 62-3-2 DIV. 20

***NUCLEAR SHELL MODELS**

(*HYDROGEN, *MOLECULES, ATOMS, *QUANTUM MECHANICS, ATOMIC ORBITALS, NUCLEAR SPINS, ENERGY, *NUCLEAR SHELL MODELS, THEORY, *NUCLEAR ENERGY LEVELS.)
THEORETICAL CHEMISTRY LAB., U. OF WISCONSIN, MADISON.
AD-274 631 62-3-2 DIV. 25

***NUCLEAR SPINS**

(*ANTIFERROMAGNETISM, *MAGNETIC SUSCEPTIBILITY, MEASUREMENT.) (PARTICLES, *NUCLEAR SPINS, LATTICES, QUANTUM MECHANICS.) (OPERATORS (MATHEMATICS), TRANSFORMATIONS (MATHEMATICS), MATRIX ALGEBRA, LINEAR SYSTEMS.)
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
AD-274 671 62-3-2 DIV. 25

***NUCLEAR WEAPONS**

(*BLAST ON *STRUCTURES, *UNDERGROUND STRUCTURES, *SHELTERS, *PRESSURE, LOAD DISTRIBUTION, ANALYSIS.) (*NUCLEAR WEAPONS, NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS, RADIATION EFFECTS, THERMAL RADIATION, ORIFICES, PROPAGATION, WAVE TRANSMISSION, *SHOCK WAVES, ATTENUATION, PRESSURE.) (*VALVES, *PNEUMATIC VALVES, *HIGH PRESSURE VALVES, *SAFETY VALVES, HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

***NUCLEATE BOILING**

(*BUBBLES, GASES, SURFACES, LIQUIDS, HEAT TRANSFER, *NUCLEATE BOILING.)
MASSACHUSETTS INST. OF TECH., DIV. OF SPONSORED RESEARCH, CAMBRIDGE.
AD-274 529 62-3-2 DIV. 20

***NUCLEI**

(*NUCLEAR PHYSICS, *ELECTROMAGNETIC FIELDS, *NUCLEAR ENERGY LEVELS, *NUCLEI, EXCITATION, *GAMMA RAYS, THEORY, PROBABILITY OF NUCLEAR MODELS.) (ELECTRONS, PHOTONS, ISOTOPES, RADIOACTIVITY.) (OXYGEN, CALCIUM, ZIRCONIUM, FLUORINE, STRONTIUM.)
STRASBOURG U. (FRANCE).
AD-274 739 62-3-2 DIV. 20

***NUCLEONS**

(*NUCLEONS, SCATTERING, THEORY AND *PIONS, RESONANCE.) (NUMERICAL ANALYSIS, MATRIX ALGEBRA, SERIES, GREEN'S FUNCTION, INTEGRAL EQUATIONS, INTEGRAL TRANSFORMS.) (*NUCLEAR PHYSICS, PHASE STUDIES.)
MARYLAND U., COLLEGE PARK.
AD-274 818 62-3-2 DIV. 20

***NUMERICAL METHODS AND PROCEDURES**

(*NUMERICAL METHODS AND PROCEDURES, STATISTICAL ANALYSIS, *PROBABILITY.) (COMPUTERS, *COMPUTER LOGIC, CODING.) (*NEUTRON SCATTERING, LATTICES, RESONANCE, ABSORPTION, ENERGY.) (NEUTRON CROSS SECTIONS FOR TUNGSTEN AND GOLD.) (RESEARCH REACTORS MODIFIED BY WATER, BERYLLIUM COMPOUNDS, OXIDES, LITHIUM COMPOUNDS, HYDRIDES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 572 62-3-2 DIV. 20

(*PARTIAL DIFFERENTIAL EQUATIONS, *NUMERICAL METHODS AND PROCEDURES, INTEGRATION, DIFFERENTIAL EQUATIONS, SERIES.) (PIPES, *FLUID FLOW, RELAXATION TIME, VISCOSITY, REYNOLDS NUMBER, CONFIGURATION.)
WEIZMANN INST. (ISRAEL).
AD-274 808 62-3-2 DIV. 15

***OPERATIONS RESEARCH**

(*RESEARCH PROGRAM ADMINISTRATION; HANDBOOKS; *OPERATIONS RESEARCH; MONITORS.) (COMPUTERS; *DATA PROCESSING SYSTEMS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 906 62-3-2 DIV. 30

***OPTICAL ANALYSIS**

(SOLIDS; *PARTICLES; DETECTION BY LIGHT SCATTERING; INTENSITY; PHOTOEMISSION; REFRACTIVE INDEX; *OPTICAL ANALYSIS.) (*GASES; *CONDENSATION; SHOCK TUBES; MEASUREMENT.) (FEASIBILITY STUDIES; THEORY.)
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 515 62-3-2 DIV. 25

***OPTICS**

(*LASERS; HELIUM, NEON, EXCITATION; *OPTICS; *MASERS.) (RARE GASES; DIFFUSION; ELECTRONS; DENSITY.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 705 62-3-2 DIV. 8

***ORBITAL FLIGHT PATHS**

(*THRUST; CONTROL SYSTEMS; GUIDANCE; *ORBITAL FLIGHT PATHS; GUIDED MISSILE TRAJECTORIES; ANALYSIS OF VARIANCE.) (COMPLEX VARIABLES; ERRORS; *CORRECTIONS.)
POLYTECHNIC INST. OF BROOKLYN, N. Y.
AD-274 749 62-3-2 DIV. 25

***OSCILLATION**

(*BODIES OF REVOLUTION; SUPERSONICS; *OSCILLATION; HARMONIC OSCILLATORS; FLUTTER; LIFT; PITCH; VELOCITY; MOMENTS; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; POTENTIAL THEORY; THEORY.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 574 62-3-2 DIV. 9

***OXYFLUORIDES**

(*OXYGEN; *FLUORINE; *CHEMICAL BONDS; THERMOCHEMISTRY.) (NITROGEN COMPOUNDS; *OXYFLUORIDES; FLUORIDES; CHLORINE COMPOUNDS; NITRATES.) (SYNTHESIS; HEAT OF FORMATION; HEAT OF REACTION; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY; FRACTIONATION.) (DESIGN OF COMBUSTION; CALORIMETERS.)
UNITED TECHNOLOGY CORP., SUNNYVALE, CALIF.
AD-274 690 62-3-2 DIV. 4

***OXYGEN**

(SHOCK WAVES; *GAS IONIZATION; PLASMA PHYSICS; *REACTION KINETICS; PHOTOEMISSION; LUMINESCENCE; ULTRAVIOLET RADIATION; CHEMICAL REACTIONS; *ACETYLENE WITH *OXYGEN; MIXTURES WITH ARGON; ADDITIVES; ACETONES; METHYL RADICALS; LEAD COMPOUNDS.) (OXIDATION; IONIZATION; TEST METHODS.)
GIBBS CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 547 62-3-2 DIV. 4

(POWER SUPPLIES; *FUEL CELLS; ELECTROLYTIC CELLS; DESIGN; *HYDROGEN; *OXYGEN; THEORY; *ELECTRODES; GRAPHITE; TEST METHODS.)
NEW YORK STATE COLL. OF CERAMICS, ALFRED U.
AD-274 616 62-3-2 DIV. 7

(*OXYGEN; *FLUORINE; *CHEMICAL BONDS; THERMOCHEMISTRY.) (NITROGEN COMPOUNDS; *OXYFLUORIDES; FLUORIDES; CHLORINE COMPOUNDS; NITRATES.) (SYNTHESIS; HEAT OF FORMATION; HEAT OF REACTION; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY; FRACTIONATION.) (DESIGN OF COMBUSTION; CALORIMETERS.)
UNITED TECHNOLOGY CORP., SUNNYVALE, CALIF.
AD-274 690 62-3-2 DIV. 4

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U. (ITALY).
AD-274 728 62-3-2 DIV. 25

***OXYGEN COMPOUNDS**

(*HYDRAULIC FLUIDS; *PHENYL RADICALS; *OXYGEN COMPOUNDS; *ETHERS.) (TESTS; *RADIATION EFFECTS; NEUTRON BOMBARDMENT; GAMMA RAYS; TEST METHODS; STABILITY; OXIDATION; CORROSION.)
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 518 62-3-2 DIV. 14

***PACKAGED CIRCUITS**

(*TRANSISTORS; SILICON; HIGH FREQUENCY; *SEMICONDUCTORS; *MANUFACTURING METHODS; PRODUCTION; PROCESSING.) (CRYSTALS; SILICON; CHEMICAL IMPURITIES; DIFFUSION; ETHYL RADICALS; SILICATES; PROPYL RADICALS; BORATES; PHOSPHORUS COMPOUNDS; OXYCHLORIDES; INDUCTANCE.) *PACKAGED CIRCUITS; DESIGN; THEORY.
PACIFIC SEMICONDUCTORS, INC., LAWNDALE, CALIF.
AD-274 833 62-3-2 DIV. 8

***PARABOLIC ANTENNAS**

(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; *RADOMES; TEST FACILITIES; DESIGN.) (*RADAR STATIONS; CONSTRUCTION; RADAR EQUIPMENT; COMMUNICATION EQUIPMENT; INSTRUMENTATION.) (SEARCH RADAR; RADAR TRACKING; MASERS.) (*HIGH PRESSURE RESEARCH; INSTRUMENTATION.) RADIOMETERS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 523 62-3-2 DIV. 8

***PARAMETRIC AMPLIFIERS**

(*MICROWAVES; PROPAGATION; ELECTROMAGNETIC WAVES; *PLASMA PHYSICS; ELECTRON BEAMS; CESIUM; ELECTRIC FIELDS; NOISE (RADIO); NONLINEAR SYSTEMS; THEORY.) (*MICROWAVE EQUIPMENT; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTROMAGNETS; FREQUENCY MULTIPLIERS; DESIGN; TESTS.)
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 587 62-3-2 DIV. 8

(*PARAMETRIC AMPLIFIERS; SOLID STATE PHYSICS; C BAND; BROADBAND; DESIGN; TESTS.) (*MICROWAVE AMPLIFIERS; *ELECTRONIC CIRCUITS; TUNED CIRCUITS; TUNING CIRCUITS; DIODES; SILICON; PACKAGING; RESONANCE; THEORY; MATHEMATICAL ANALYSIS.) (*TUNED AMPLIFIERS; BACKWARD-WAVE OSCILLATORS.)
MICROMEGA CORP., VENICE, CALIF.
AD-274 619 62-3-2 DIV. 8

(*PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; BROADBAND; NARROWBAND; X BAND; K BAND; ELECTRONIC CIRCUITS; FEASIBILITY STUDIES; DESIGN; THEORY.) (*COUPLING CIRCUITS; CYCLOTRONS; WAVE TRANSMISSION; PROPAGATION; HELIXES; IMPEDANCE; ELECTRON GUNS; MAGNETIC FIELDS; SPACE CHARGES; *ELECTRON BEAMS; TESTS.)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 845 62-3-2 DIV. 8

***PARTIAL DIFFERENTIAL EQUATIONS**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY; THEORY OF *SOLIDS.) (*MECHANICS; SHEAR STRESSES; LOAD DISTRIBUTION; DEFORMATION; DYNAMICS; POTENTIAL THEORY; KINETIC THEORY.) (*SOLID STATE PHYSICS; CRYSTALS; METALLIC CRYSTALS.)
LABORATORY FOR INSULATION RESEARCH, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

(*PARTIAL DIFFERENTIAL EQUATIONS; *NUMERICAL METHODS AND PROCEDURES; INTEGRATION; DIFFERENTIAL EQUATIONS; SERIES.) (PIPES; *FLUID FLOW; RELAXATION TIME; VISCOSITY; REYNOLDS NUMBER; CONFIGURATION.)
WEIZMANN INST. (ISRAEL).
AD-274 808 62-3-2 DIV. 15

(FREE SURFACES OF *ELASTICITY; *SOLIDS AT SUPERSONICS; VELOCITY; VIBRATION; *STRESSES; *SHEAR STRESSES; LOADING; LOAD DISTRIBUTION.) (*PARTIAL DIFFERENTIAL EQUATIONS; TIME.)
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
AD-274 849 62-3-2 DIV. 25

***PARTICLES**

(SOLIDS; *PARTICLES; DETECTION BY LIGHT SCATTERING; INTENSITY; PHOTOEMISSION; REFRACTIVE INDEX; *OPTICAL ANALYSIS.) (*GASES; *CONDENSATION; SHOCK TUBES; MEASUREMENT.) (FEASIBILITY STUDIES; THEORY.)
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING, ITHACA, N. Y.
AD-274 515 62-3-2 DIV. 25

(*PLASMA PHYSICS; *ELECTRON BEAMS; *PARTICLES; ELECTRONS; IONS IN MAGNETIC FIELDS; TRANSPORT PROPERTIES.) (TEMPERATURE; PRESSURE; ENERGY.) (TRANSFORMATIONS (MATHEMATICS); HYDRODYNAMICS; EQUATIONS; PARTIAL DIFFERENTIAL EQUATIONS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 649 62-3-2 DIV. 25

***PARTICULATE FILTERS**

(GUIDED MISSILES; SURFACE TO AIR; COMMAND SYSTEMS; CONTROL SYSTEMS; *COMBAT INFORMATION CENTERS; RADAR STATIONS; DISPLAY SYSTEMS; GROUND SUPPORT EQUIPMENT; *AIR CONDITIONING EQUIPMENT; AIR; *PARTICULATE FILTERS; EFFECTIVENESS; TESTS.) (AIR CONDITIONING EQUIPMENT; TEMPERATURE; LOW TEMPERATURE RESEARCH; TESTS; *RADAR TRAILERS.)
ORDNANCE MISSION; WHITE SANDS MISSILE RANGE, N. MEX.
AD-274 990 62-3-2 DIV. 13

***PELLETS**

*VORTICES IN CONDENSATION TRAILS OF *HYPERVELOCITY PROJECTILES; *PELLETS IN XENON; BLUNT BODIES IN *SUBSONIC FLOW AND *HYPERSONIC FLOW AT LOW REYNOLDS NUMBER; SELF LUMINESCENCE; PHOTOGRAPHS OF TURBULENT FLOW; HYPERSONICS; WAKE.
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 538 62-3-2 DIV. 9

***PHASE MEASUREMENT**

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***PHASE STUDIES**

(*SEMICONDUCTORS; *INTERMETALLIC COMPOUNDS; CRYSTALS; *SINGLE CRYSTALS; ALLOYS; *LEAD ALLOYS; *TELLURIUM ALLOYS; TELLURIDES.) (*PHASE STUDIES; TEMPERATURE; VAPOR PRESSURE; THERMODYNAMICS; THEORY.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 496 62-3-2 DIV. 17

***PHENOLIC RESINS**

(*ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; MATERIALS; BINDERS; *HEAT RESISTANT POLYMERS; *COMPOSITE MATERIALS; SILICONE RESINS; *EPOXY RESINS; *PHENOLIC RESINS; ASBESTOS FIBERS; REINFORCING MATERIALS; MECHANICAL PROPERTIES; TESTS; AGING.) (PHTHALIC ANHYDRIDES; ANHYDRIDES; FURANS; CYANAMIDES; CYANURIC ACID; ESTERS; HETEROCYLIC COMPOUNDS; RESINS; CASTOR OIL.)
ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
AD-274 533 62-3-2 DIV. 14

***PHENYL RADICALS**

(*HYDRAULIC FLUIDS; *PHENYL RADICALS; *OXYGEN COMPOUNDS; *ETHERS.) (TESTS; *RADIATION EFFECTS; NEUTRON BOMBARDMENT; GAMMA RAYS; TEST METHODS; STABILITY; OXIDATION; CORROSION.)
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 518 62-3-2 DIV. 14

***PHOSPHORUS COMPOUNDS**

(*HEAT RESISTANT POLYMERS; *POLYMERS; METALORGANIC COMPOUNDS; *BORON COMPOUNDS; *PHOSPHORUS COMPOUNDS; ORGANOBORANES; BORINES; PENTABORANES; DECABORANES; PHOSPHINOBORINES; CHEMICAL REACTIONS; SYNTHESIS.) (PHENYL RADICALS; PHOSPHINES; DECABORANES.) (PYROLYSIS; CHEMICAL ANALYSIS; INFRARED SPECTROSCOPY.)
OLIN MATHIESON CHEMICAL CORP., NEW HAVEN, CONN.
AD-274 830 62-3-2 DIV. 4

***PHOTOELASTICITY**

(*FORGE PRESSES; CARBIDES; TUNGSTEN COMPOUNDS; COBALT; PHYSICAL PROPERTIES; STRESSES; TESTS; DESIGN; CONFIGURATION.) (LOAD DISTRIBUTION; *PHOTOELASTICITY.)
ENGINEERING SUPERVISION CO., NEW YORK.
AD-274 731 62-3-2 DIV. 21

***PHOTOELECTRIC CELLS**

(*PHOTOELECTRIC CELLS; INDIUM COMPOUNDS; ANTIMONIDES; *NOISE; PHOTOCONDUCTIVITY.) (LOW TEMPERATURE RESEARCH; LIQUEFIED GASES; NITROGEN.)
E. M. I. ELECTRONICS, LTD. (GT. BRIT.).
AD-274 473 62-3-2 DIV. 25

***PHOTOELECTRONS**

(*PHOTOEMISSION; SODIUM, GERMANIUM; SILICON; *CRYSTALS; WORK FUNCTIONS; TESTS.) (SEMICONDUCTORS; SPACE CHARGES; IONIC CURRENT; ADSORPTION; *PHOTOELECTRONS; ELECTRONS; SURFACE PROPERTIES; MEASUREMENT.) (THIN FILMS; SODIUM COMPOUNDS; ANTIMONIDES; PROCESSING.)
PHYSICAL ELECTRONICS RESEARCH LAB., INSTITUTE OF TECH., U. OF MINN., MINNEAPOLIS.
AD-274 712 62-3-2 DIV. 25

***PHOTOEMISSION**

(*ALLOYS; *METALS; *CERAMIC COATINGS; *CERAMIC MATERIALS; THERMAL RADIATION; REFLECTION; ABSORPTION; BLACKBODY RADIATION; SPECTROGRAPHIC ANALYSIS; SPECTROPHOTOMETERS; SPECTROGRAPHIC DATA; ULTRAVIOLET RADIATION; LIGHT; INFRARED RADIATION; *PHOTOEMISSION.) (CHROMIUM ALLOYS; NICKEL ALLOYS; STEEL; COBALT ALLOYS.) (BERYLLIUM; NIOBIUM; TANTALUM; TITANIUM; TUNGSTEN; VANADIUM; *METAL

COATINGS.) (BORON COMPOUNDS, CARBIDES, TANTALUM COMPOUNDS, ZIRCONIUM COMPOUNDS, OXIDES, MOLYBDENUM COMPOUNDS, SILICIDES.) (TUNGSTEN ALLOYS, STAINLESS STEEL, TITANIUM ALLOYS, MOLYBDENUM ALLOYS, IRON ALLOYS.)
NORTHROP CORP., HAWTHORNE, CALIF.
AD-274 598 62-3-2 DIV. 17

(*PHOTOEMISSION, SODIUM, GERMANIUM, SILICON, *CRYSTALS, *WORK FUNCTIONS, TESTS.) (SEMICONDUCTORS, SPACE CHARGES, IONIC CURRENT, ADSORPTION, *PHOTOELECTRONS, ELECTRONS, SURFACE PROPERTIES, MEASUREMENT.) (THIN FILMS, SODIUM COMPOUNDS, ANTIMONIDES, PROCESSING.)
PHYSICAL ELECTRONICS RESEARCH LAB., INSTITUTE OF TECH., U. OF MINN., MINNEAPOLIS.
AD-274 712 62-3-2 DIV. 25

***PHOTOLYSIS**

(PHOTOCHEMISTRY, PHOTOCHEMICAL REACTIONS, REACTION KINETICS, *PHOTOLYSIS OF HYDROCARBONS AND DEUTERATED COMPOUNDS CONTAINING *METHYL RADICALS, *METHYL RADICALS, *IODIDES, LOW TEMPERATURE RESEARCH.) (PHOTONS, ABSORPTION AND *HYDROGEN ABSTRACTION, ENERGY DISSIPATION.) (SOLIDS, NITROGEN, KRYPTON, XENON.) INFRARED SPECTROSCOPY.
CALIFORNIA U., BERKELEY.
AD-274 797 62-3-2 DIV. 4

***PIONS**

(*NUCLEONS, SCATTERING, THEORY AND *PIONS, RESONANCE.) (NUMERICAL ANALYSIS, MATRIX ALGEBRA, SERIES, GREEN'S FUNCTION, INTEGRAL EQUATIONS, INTEGRAL TRANSFORMS.) (*NUCLEAR PHYSICS, PHASE STUDIES.)
MARYLAND U., COLLEGE PARK.
AD-274 818 62-3-2 DIV. 20

***PITOT TUBES**

(*FLIGHT INSTRUMENTS, MEASUREMENT OF PRESSURE.) (*PITOT TUBES, SUPERSONICS, AERODYNAMICS, MODEL TESTS, WIND TUNNEL MODELS.)
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER, LOS ANGELES.
AD-274 629 62-3-2 DIV. 9

***PLANETS**

(*INTERSTELLAR MATTER, MAGNETIC FIELDS, TERRESTRIAL MAGNETISM, GRAVITY, SOLAR ENERGY, VAN ALLEN RADIATION BELTS, ULTRAVIOLET RADIATION, SUN.) (MOON, PLANETARY ATMOSPHERES, TERRAIN, GEOLOGY.) (MARS, VENUS, JUPITER, SATURN, URANUS, PLUTO.) (GALAXIES, STARS, SPECTROGRAPHIC ANALYSIS.) (*ASTRONOMY, *ASTROPHYSICS.) *PLANETS.
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 652 62-3-2 DIV. 2

***PLASMA JETS**

(*TRANSDUCERS, MEASUREMENT, ELECTRICAL CONDUCTANCE, *PLASMA JETS, *INSTRUMENTATION.) (GAS FLOW, VELOCITY, TESTS, ARGON.) (CONDUCTORS, CALIBRATION, ALUMINUM, STAINLESS STEEL, GRAPHITE.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 699 62-3-2 DIV. 25

***PLASMA OSCILLATIONS**

(*PLASMA PHYSICS, MECHANICAL PROPERTIES, *NON-LINEAR DIFFERENTIAL EQUATIONS, MAGNETIC FIELDS, ELECTROMAGNETIC EFFECTS, SOLAR ENERGY.) (*ENTROPY, PARTICLES, DISTRIBUTION THEORY.) *PLASMA OSCILLATIONS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 756 62-3-2 DIV. 25

***PLASMA PHYSICS** (*MICROWAVES, PROPAGATION, ELECTROMAGNETIC WAVES, *PLASMA PHYSICS, ELECTRON BEAMS, CESIUM, ELECTRIC FIELDS, NOISE (RADIO), NONLINEAR SYSTEMS, THEORY.) (*MICROWAVE EQUIPMENT, *PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, *ELECTRON TUBES, CATHODES (ELECTRON TUBES), ELECTROMAGNETS, FREQUENCY MULTIPLIERS, DESIGN, TESTS.)
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 587 62-3-2 DIV. 8

(*PLASMA PHYSICS, PARTICLES, *ELECTROMAGNETIC EFFECTS, DIFFUSION, *TRANSPORT PROPERTIES.) (PHYSICAL PROPERTIES, DENSITY, ENERGY, TEMPERATURE.)
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER, LOS ANGELES.
AD-274 627 62-3-2 DIV. 25

(*PLASMA PHYSICS, *ELECTRON BEAMS, *PARTICLES, ELECTRONS, IONS IN MAGNETIC FIELDS, TRANSPORT PROPERTIES.) (TEMPERATURE, PRESSURE, ENERGY.) (TRANSFORMATIONS (MATHEMATICS), HYDRODYNAMICS, EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 645 62-3-2 DIV. 25

(*PLASMA PHYSICS, GAS IONIZATION OF *CESIUM VAPORS BY *SHOCK TUBES.) (MEASUREMENT, TEMPERATURE, PRESSURE, DENSITY, EXPERIMENTAL DATA, CALIBRATION, INSTRUMENTATION, DESIGN, PHOTOGRAPHIC ANALYSIS.) (THERMODYNAMICS AND HYDRODYNAMICS, EQUATIONS.)
PRINCETON U., N. J.
AD-274 672 62-3-2 DIV. 25

(*ELECTRIC POWER PRODUCTION, GENERATORS, *ELECTRIC PROPULSION, *THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM ELECTRON TUBES, CATHODES (ELECTRON TUBES), DESIGN, SEALS, MATERIALS, CERAMIC MATERIALS, LABORATORY EQUIPMENT, SPECTROGRAPHIC ANALYSIS, ELECTRIC INSULATION, HIGH TEMPERATURE RESEARCH, LOW PRESSURE RESEARCH.) (CESIUM, GAS IONIZATION, VAPORS, THERMODYNAMICS, TRANSPORT PROPERTIES.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 694 62-3-2 DIV. 25

(*MAGNETOHYDRODYNAMICS, DETONATION WAVES, ELECTRICITY, CONDUCTIVITY, GASES.) (MAGNETIC FIELDS, *PLASMA PHYSICS.) (HIGH TEMPERATURE RESEARCH, *THERMONUCLEAR REACTIONS, REACTION TIME, SHOCK.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 697 62-3-2 DIV. 25

(*PLASMA PHYSICS, PLASMA OSCILLATIONS, *MAGNETIC PINCH IN MAGNETIC FIELDS, GAS DISCHARGES.) (INSTRUMENTATION, OSCILLATORS, ELECTRON TUBES, DISCHARGE TUBES, PHOTOMULTIPLIERS.) (MEASUREMENT OF ELECTRONS, DENSITY, TEMPERATURE.) (SPECTROGRAPHIC ANALYSIS IN CONTINUOUS MEDIA.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 700 62-3-2 DIV. 25

(*DYNAMICS, NONLINEAR SYSTEMS, THEORY OF *ELECTROMAGNETIC WAVES, PROPAGATION IN IONIZATION (IONIZED MEDIA).) (*RADIO WAVES, REFLECTION.) (ELECTRONS, DENSITY.) (*PLASMA PHYSICS, RESONANCE, PLASMA OSCILLATIONS, DIFFERENTIAL EQUATIONS, SPACE CHARGES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 726 62-3-2 DIV. 25

(*FLUID MECHANICS, GASES, PARTICLES, MIXTURES, *GAS FLOW, GAS IONIZATION, MAGNETOHYDRODYNAMICS, *PLASMA PHYSICS, PLASMA JETS, THERMODYNAMICS, *REACTION KINETICS, KINETIC THEORY, CHEMICAL REACTIONS, SURFACES, CATALYSIS.) (ALUMINUM, SOLID ROCKET PROPELLANTS, *COMBUSTION, FLARES.) (*JET PROPULSION, RECOMBINATION REACTIONS.)
JAMES FORRESTAL RESEARCH CENTER, PRINCETON U., N. J.
AD-274 748 62-3-2 DIV. 9

(*PLASMA PHYSICS, MECHANICAL PROPERTIES, *NON-LINEAR DIFFERENTIAL EQUATIONS, MAGNETIC FIELDS, ELECTROMAGNETIC EFFECTS, SOLAR ENERGY.) (*ENTROPY, PARTICLES, DISTRIBUTION THEORY.) *PLASMA OSCILLATIONS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 756 62-3-2 DIV. 25

(*PLASMA PHYSICS, *SPHERES, DIELECTRIC PROPERTIES, ELECTROMAGNETIC WAVES, SCATTERING, ELECTROMAGNETIC WAVE REFLECTIONS, *RADAR ECHO AREAS, ELECTROMAGNETIC THEORY, MATHEMATICAL PREDICTION.)
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
AD-274 795 62-3-2 DIV. 6

***PNEUMATIC DEVICES**

(*LANDING IMPACT, *PNEUMATIC DEVICES, IMPACT SHOCK, SHOCK RESISTANCE, SHOCK ATTENUATION, ABSORPTION.) (COMPRESSION SHOCK, SHOCK WAVES, FLUID MECHANICS, STRESSES, THEORY, MATHEMATICAL ANALYSIS.) (EQUATIONS OF MOTION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 388 62-3-2 DIV. 9

***PNEUMATIC VALVES**

(*BLAST ON *STRUCTURES, *UNDERGROUND STRUCTURES, *SHELTERS, *PRESSURE, LOAD DISTRIBUTION, ANALYSIS.) (*NUCLEAR WEAPONS, NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS, RADIATION EFFECTS, THERMAL RADIATION, ORIFICES, PROPAGATION, WAVE TRANSMISSION, *SHOCK WAVES, ATTENUATION, PRESSURE.) (*VALVES, *PNEUMATIC VALVES, *HIGH PRESSURE VALVES, *SAFETY VALVES, HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

***POLYMERIZATION**

(*POLYMERS, *ELASTOMERS, *SILICON COMPOUNDS, *NITROGEN COMPOUNDS, *AMINES, AZO RADICALS, SYNTHESIS, *POLYMERIZATION, CHEMICAL REACTIONS.) (STABILITY, TEMPERATURE, HYDROLYSIS.) (METHYL RADICALS, SILICONES, HETEROCYCLIC COMPOUNDS, ETHYL RADICALS, PHENYL RADICALS, OXYGEN COMPOUNDS, VINYL RADICALS, CHLORIDES.)
HALLINCKRODT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 520 62-3-2 DIV. 4

***POLYMERS**

(*POLYMERS, *ELASTOMERS, *SILICON COMPOUNDS, *NITROGEN COMPOUNDS, *AMINES, AZO RADICALS, SYNTHESIS, *POLYMERIZATION, CHEMICAL REACTIONS.) (STABILITY, TEMPERATURE, HYDROLYSIS.) (METHYL RADICALS, SILICONES, HETEROCYCLIC COMPOUNDS, ETHYL RADICALS, PHENYL RADICALS, OXYGEN COMPOUNDS, VINYL RADICALS, CHLORIDES.)
HALLINCKRODT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 520 62-3-2 DIV. 4

(*HEAT RESISTANT POLYMERS, *POLYMERS, METALORGANIC COMPOUNDS, *BORON COMPOUNDS, *PHOSPHORUS COMPOUNDS, ORGANOBORANES, BORINES, PENTABORANES, DECABORANES, PHOSPHINOBORINES, CHEMICAL REACTIONS, SYNTHESIS.) (PHENYL RADICALS, PHOSPHINES, DECABORANES.) (PYROLYSIS, CHEMICAL ANALYSIS, INFRARED SPECTROSCOPY.)
OLIN MATHIESON CHEMICAL CORP., NEW HAVEN, CONN.
AD-274 830 62-3-2 DIV. 4

***POTASSIUM COMPOUNDS**

(*SINGLE CRYSTALS, *CRYSTALS, MICA, THIN FILMS, GROWTH, *CRYSTALLIZATION, ZONE MELTING, MANUFACTURING METHODS, CRYSTAL OVENS, LABORATORY EQUIPMENT, *BIBLIOGRAPHY.) (PRODUCTION, SHEETS, SOLIDS, SOLUTIONS, *POTASSIUM COMPOUNDS, ALUMINUM COMPOUNDS, *RUBIDIUM COMPOUNDS, BORON COMPOUNDS, *FLUORIDES, *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***POWDER METALLURGY**

(PRODUCTION, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS, SHEETS, *POWDER METALLURGY, CONTROLLED ATMOSPHERES, VACUUM FURNACES, *SINTERING.) (ADDITIVES, CARBON, HYDROGEN, NITROGEN, OXYGEN, HEAT TREATMENT, HARDENING, DISPERSION HARDENING, TITANIUM COMPOUNDS, CARBIDES, NITRIDES, OXIDES.) (ALLOYS, HEAT RESISTANT ALLOYS, POWDER ALLOYS, POWDER METALS, HARDNESS, MICROSTRUCTURE, TENSILE PROPERTIES, PROCESSING.)
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
AD-274 611 62-3-2 DIV. 17

***POWER DIVIDERS**

(*POWER DIVIDERS, *WAVEGUIDE COUPLERS, *MICROWAVE EQUIPMENT, WAVEGUIDE JOINTS, THEORY, DESIGN.) (*WAVEGUIDES, *COAXIAL CABLES, IMPEDANCE MATCHING, PHASE MEASUREMENT.) ANTENNAS.
MERRIMAC RESEARCH AND DEVELOPMENT, INC., IRVINGTON, N. J.
AD-274 693 62-3-2 DIV. 8

(DESIGN, THEORY, *WAVEGUIDE FILTERS, *WAVEGUIDE JOINTS FOR *MULTIPLEX TRANSMISSION, MULTIPLE OPERATION, RADIO TRANSMITTERS, RADIO RECEIVERS, RADAR TRANSMITTERS, RADAR RECEIVERS, ULTRA HIGH FREQUENCY, SUPERHIGH FREQUENCY, MICROWAVE FREQUENCY.) SWITCHING CIRCUITS, COAXIAL FILTERS, *POWER DIVIDERS, WAVEGUIDE COUPLERS, TRANSMISSION LINES, MATHEMATICAL ANALYSIS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 524 62-3-2 DIV. 8

***PRASEODYMIUM COMPOUNDS**

(SOLID STATE PHYSICS, *CERAMIC MATERIALS, RARE EARTH COMPOUNDS, *CERIUM COMPOUNDS, *PRASEODYMIUM COMPOUNDS, LANTHANUM COMPOUNDS, OXIDES, ELECTRICAL PROPERTIES, MEASUREMENT, TRANSIENTS, ELECTRICAL CONDUCTANCE, ELECTRIC CURRENTS, ELECTRIC POTENTIAL, TEMPERATURE (20 TO 600 C).) (MICROBALANCES, FREQUENCY, OXYGEN, TRANSPORT PROPERTIES.)
ARIZONA STATE U., TEMPE.
AD-274 510 62-3-2 DIV. 25

(*RE-ENTRY VEHICLES, INSTRUMENTATION.) (*TRANSDUCERS, *PRESSURE, ATMOSPHERE, AIR.) (GASES, COMPRESSIBLE FLOW, SUPERAERODYNAMICS.) (PRESSURE GAGES, GASES.) TIME.
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER, LOS ANGELES.
AD-274 626 62-3-2 DIV. 30

(*BLAST ON *STRUCTURES, *UNDERGROUND STRUCTURES, *SHELTERS, *PRESSURE, LOAD DISTRIBUTION, ANALYSIS.) (*NUCLEAR WEAPONS, NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS, RADIATION EFFECTS, THERMAL RADIATION, ORIFICES, PROPAGATION, WAVE TRANSMISSION, *SHOCK WAVES, ATTENUATION, PRESSURE.) (*VALVES, *PNEUMATIC VALVES, *HIGH PRESSURE VALVES, *SAFETY VALVES, HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

***PRESSURE EXCHANGERS**

(MECHANICAL PROPERTIES, *ENERGY, TRANSFORMERS.) (*PRESSURE EXCHANGERS, TURBINES, THRUST, LIFT, *FLUID FLOW.)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 780 62-3-2 DIV. 25

***PROBABILITY**

(*NUMERICAL METHODS AND PROCEDURES; STATISTICAL ANALYSIS; *PROBABILITY.) (COMPUTERS; *COMPUTER LOGIC; CODING.) (*NEUTRON SCATTERING; LATTICES; RESONANCE; ABSORPTION; ENERGY.) (NEUTRON CROSS SECTIONS FOR TUNGSTEN AND GOLD.) (RESEARCH REACTORS MODIFIED BY WATER; BERYLLIUM COMPOUNDS; OXIDES; LITHIUM COMPOUNDS; HYDRIDES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 572 62-3-2 DIV. 20

***PROGRAMMING**

(DIFFERENTIAL EQUATIONS; INTEGRATION; *DIGITAL COMPUTERS; *PROGRAMMING.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 538 62-3-2 DIV. 30

(*DATA STORAGE SYSTEMS; DIGITAL COMPUTERS; *PUNCHED CARD METHODS; SEQUENCES; CODING; *PROGRAMMING; FACTOR ANALYSIS; TRANSFORMATIONS (MATHEMATICS).) (*COMPUTERS; COMPUTER LOGIC; MAGNETIC TAPE.) (TESTS; ANALYSIS.)
WASHINGTON U., SEATTLE.
AD-274 634 62-3-2 DIV. 30

(*SEISMIC WAVES; MATHEMATICAL ANALYSIS; DIGITAL COMPUTERS; *PROGRAMMING; *BIBLIOGRAPHY.)
ACOUSTICS AND SEISMICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 659 62-3-2 DIV. 30

(*COMPUTERS; *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS; SERIES.) (THEORY AND STRUCTURES OF *DATA PROCESSING SYSTEMS; *DATA STORAGE SYSTEMS.) (ERRORS; NUMERICAL ANALYSIS; SEQUENCES.)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***PROPELLANT GRAINS**

(*SOLID ROCKET PROPELLANTS; *PROPELLANT GRAINS; TEMPERATURE; PRESSURE; *IGNITION; FLAMES; *COMBUSTION; FLAME PROPAGATION; THEORY; TESTS; MATHEMATICAL ANALYSIS; EQUATIONS.) SHOCK TUBES.
UTAH U., SALT LAKE CITY.
AD-274 624 62-3-2 DIV. 10

***PROPELLANT TANKS**

(*SATELLITE VEHICLES; *BOOSTER ROCKETS; FUEL SYSTEMS; *LIQUID ROCKET PROPELLANTS.) (*PROPELLANT TANKS; TEMPERATURE CONTROL; VENTILATION; SPACE ENVIRONMENTAL CONDITIONS; WEIGHTLESSNESS; ACCELERATION.) (ROCKET FUELS; ROCKET OXIDIZERS; SURFACE PROPERTIES; SURFACE TENSION.) GAS PRESSURIZATION SYSTEMS.
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 682 62-3-2 DIV. 27

***PROPELLANTS**

(*WIRE; *DETONATION; *PROPULSION; *PROPELLANTS; GAS DISCHARGES; SATELLITE VEHICLE RESEARCH.) (INSTRUMENTATION; PHOTOMULTIPLIERS; *SCHLIEREN PHOTOGRAPHY; SPECTROGRAPHIC CAMERAS.) (FEASIBILITY STUDIES; TESTS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 643 62-3-2 DIV. 25

***PROPULSION**

(*WIRE; *DETONATION; *PROPULSION; *PROPELLANTS; GAS DISCHARGES; SATELLITE VEHICLE RESEARCH.) (INSTRUMENTATION; PHOTOMULTIPLIERS; *SCHLIEREN PHOTOGRAPHY; SPECTROGRAPHIC CAMERAS.) (FEASIBILITY STUDIES; TESTS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 643 62-3-2 DIV. 25

***PROTON ACCELERATORS**

(*CIRCUITS; DESIGN; *TRANSDUCERS; *PROTON ACCELERATORS.) (CESIUM COMPOUNDS; IODIDES; CRYSTALS.) (INSTRUMENTATION; ELECTRON MULTIPLIERS; PHOTOTUBES.) (*SATELLITE VEHICLE RESEARCH; FLIGHT PATHS; FLIGHT TESTING.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 702 62-3-2 DIV. 30

***PROTON COUNTERS**

(DETECTORS; LITHIUM; PULSE AMPLIFIERS; TRIGGER CIRCUITS.) (PROTONS; FLUXMETERS.) *PROTON COUNTERS.
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 704 62-3-2 DIV. 20

***PROTONS**

(*EXTRATERRESTRIAL RADIO WAVES; ATTENUATION; IONOSPHERE; SOLAR ENERGY; *PROTONS; SOLAR FLARES; MAGNETIC STORMS.)
GEOPHYSICAL INST., U. OF ALASKA, COLLEGE.
AD-274 462 62-3-2 DIV. 2

***PULSE MODULATION**

(*VOICE COMMUNICATION SYSTEMS; *DIGITAL SYSTEMS; DATA STORAGE SYSTEMS; *SPEECH TRANSMISSION; CODING; INTELLIGIBILITY; AUDIOFREQUENCY; SIDEBANDS; DESIGN; TESTS.) (TRANSISTOR AMPLIFIERS; BAND-SELECTIVE AMPLIFIERS; BAND-PASS AMPLIFIERS; BAND-PASS FILTERS; ACOUSTIC FILTERS; TIMING CIRCUITS.) (PULSE GENERATORS; *PULSE MODULATION; PULSE TRANSMITTERS; CRYSTAL OSCILLATORS; *DATA PROCESSING SYSTEMS; *ANALOG-TO-DIGITAL CONVERTERS.)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
AD-274 466 62-3-2 DIV. 5

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS, NEW YORK.
AD-274 840 62-3-2 DIV. 5

***PUNCHED CARD METHODS**

(*DATA STORAGE SYSTEMS; DIGITAL COMPUTERS; *PUNCHED CARD METHODS; SEQUENCES; CODING; *PROGRAMMING; FACTOR ANALYSIS; TRANSFORMATIONS (MATHEMATICS).) (*COMPUTERS; COMPUTER LOGIC; MAGNETIC TAPE.) (TESTS; ANALYSIS.)
WASHINGTON U., SEATTLE.
AD-274 634 62-3-2 DIV. 30

***QUANTUM MECHANICS**

(*HYDROGEN; *MOLECULES; ATOMS; *QUANTUM MECHANICS; ATOMIC ORBITALS; NUCLEAR SPINS; ENERGY; *NUCLEAR SHELL MODELS; THEORY; *NUCLEAR ENERGY LEVELS.)
THEORETICAL CHEMISTRY LAB., U. OF WISCONSIN, MADISON.
AD-274 631 62-3-2 DIV. 25

(*QUANTUM MECHANICS; NUCLEAR MAGNETIC RESONANCE; *RESONANCE.) (SPIN; DENSITY; OSCILLATION; *MAGNETIC FIELDS; DIFFERENTIAL EQUATIONS.) THESES.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 740 62-3-2 DIV. 25

***RADAR**

(*BIBLIOGRAPHY; *GUIDED MISSILES.) (*RADAR; *RADAR ANTENNAS; RADAR ANTIJAMMING; RADAR DECEPTION; RADAR JAMMING; COUNTERMEASURES; RADAR TRACKING.) (INFRARED PHOTOCONDUCTORS; PHOTOELECTRIC MATERIALS; DETECTION.) *GUIDED MISSILE FUZES; FERROELECTRIC MATERIALS; SCIENTIFIC RESEARCH; CHEMISTRY; POLYMERS.
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 561 62-3-2 DIV. 12

***RADAR ANTENNAS**

(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; *RADOMES; TEST FACILITIES, DESIGN.) (*RADAR STATIONS; CONSTRUCTION; RADAR EQUIPMENT; COMMUNICATION EQUIPMENT; INSTRUMENTATION.) (SEARCH RADAR; RADAR TRACKING; MASERS.) (*HIGH PRESSURE RESEARCH; INSTRUMENTATION.) RADIOMETERS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 523 62-3-2 DIV. 8

(*BIBLIOGRAPHY; *GUIDED MISSILES.) (*RADAR; *RADAR ANTENNAS; RADAR ANTIJAMMING; RADAR DECEPTION; RADAR JAMMING; COUNTERMEASURES; RADAR TRACKING.) (INFRARED PHOTOCONDUCTORS; PHOTOELECTRIC MATERIALS; DETECTION.) *GUIDED MISSILE FUZES; FERROELECTRIC MATERIALS; SCIENTIFIC RESEARCH; CHEMISTRY; POLYMERS.
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 561 62-3-2 DIV. 12

***RADAR ECHO AREAS**

(DENSITY OF *RADAR REFLECTIONS; *RADAR ECHO AREAS FROM *METEORS.) ITALY, FLORENCE U. (ITALY).
AD-274 468 62-3-2 DIV. 6

(*PLASMA PHYSICS; *SPHERES; DIELECTRIC PROPERTIES; ELECTROMAGNETIC WAVES; SCATTERING; ELECTROMAGNETIC WAVE REFLECTIONS; *RADAR ECHO AREAS; ELECTROMAGNETIC THEORY; MATHEMATICAL PREDICTION.)
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
AD-274 795 62-3-2 DIV. 6

***RADAR RECEIVERS**

(*RADAR SIGNALS; NOISE (RADAR); FUNCTIONAL ANALYSIS; NUMERICAL METHODS AND PROCEDURES; *LIMITERS; BAND-PASS FILTERS; BROADBAND; NARROWBAND IN *RADAR RECEIVERS; SEARCH RADAR.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 684 62-3-2 DIV. 8

(RADAR BEACONS; *RADAR RECEIVERS; AIRBORNE USING RADAR SIGNALS FROM RADAR TRACKING; *COMMAND SYSTEMS AS CONTROL SYSTEMS FOR RADAR JAMMING; RADAR TRANSMITTERS DURING TESTS OF ANTIAIRCRAFT DEFENSE SYSTEMS.) (FEASIBILITY STUDIES OF USING RADAR RECEIVERS, RADAR BEACONS FROM GUIDED MISSILES; SURFACE TO AIR, COMMAND SYSTEMS IN RADAR JAMMING; AIRCRAFT.)
ARMY AIR DEFENSE BOARD, FORT BLISS, TEX.
AD-274 708 62-3-2 DIV. 6

***RADAR REFLECTIONS**

(DENSITY OF *RADAR REFLECTIONS; *RADAR ECHO AREAS FROM *METEORS.) ITALY, FLORENCE U. (ITALY).
AD-274 468 62-3-2 DIV. 6

***RADAR SIGNALS**

(*RADAR SIGNALS; NOISE (RADAR); FUNCTIONAL ANALYSIS; NUMERICAL METHODS AND PROCEDURES; *LIMITERS; BAND-PASS FILTERS; BROADBAND; NARROWBAND IN *RADAR RECEIVERS; SEARCH RADAR.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 684 62-3-2 DIV. 8

(*RADAR SIGNALS; RADAR PULSES; SCATTERING; *ATTENUATION; IONOSPHERIC PROPAGATION; *IONOSPHERE; TEMPERATURE; WAVE TRANSMISSION; *ELECTROMAGNETIC WAVE REFLECTIONS; INTEGRAL TRANSFORMS; SPECTROGRAPHIC ANALYSIS.)
CORNELL U., ITHACA, N. Y.
AD-274 721 62-3-2 DIV. 8

***RADAR STATIONS**

(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; *RADOMES; TEST FACILITIES, DESIGN.) (*RADAR STATIONS; CONSTRUCTION; RADAR EQUIPMENT; COMMUNICATION EQUIPMENT; INSTRUMENTATION.) (SEARCH RADAR; RADAR TRACKING; MASERS.) (*HIGH PRESSURE RESEARCH; INSTRUMENTATION.) RADIOMETERS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 523 62-3-2 DIV. 8

***RADAR TRAILERS**

(GUIDED MISSILES, SURFACE TO AIR; COMMAND SYSTEMS; CONTROL SYSTEMS; *COMBAT INFORMATION CENTERS; RADAR STATIONS; DISPLAY SYSTEMS; GROUND SUPPORT EQUIPMENT; *AIR CONDITIONING EQUIPMENT; AIR; *PARTICULATE FILTERS; EFFECTIVENESS; TESTS.) (AIR CONDITIONING EQUIPMENT, TEMPERATURE; LOW TEMPERATURE RESEARCH; TESTS; *RADAR TRAILERS.)
ORDNANCE MISSION; WHITE SANDS MISSILE RANGE, N. MEX.
AD-274 590 62-3-2 DIV. 13

***RADIATION EFFECTS**

(*HYDRAULIC FLUIDS; *PHENYL RADICALS; *OXYGEN COMPOUNDS; *ETHERS.) (TESTS; *RADIATION EFFECTS; NEUTRON BOMBARDMENT; GAMMA RAYS; TEST METHODS; STABILITY; OXIDATION; CORROSION.)
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 518 62-3-2 DIV. 14

***RADIO BEAMS**

(*IONOSPHERE; ELECTRONS; HEATING; *RADIO BEAMS.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 724 62-3-2 DIV. 2

***RADIO COMMUNICATION SYSTEMS**

(*COMMUNICATION SYSTEMS; TESTS; *STANDARDS; DESIGN; THEORY; TEST METHODS.) (*WAVE TRANSMISSION; RADIO WAVES; SCATTERING BY IONOSPHERE, ATMOSPHERE AND METEORS; VERY LOW FREQUENCY; IONOSPHERIC PROPAGATION; TRANSMISSION LINES; RADIOFREQUENCY CABLES; SATELLITE VEHICLES; RADIO TRANSMISSION; MICROWAVE RELAY SYSTEMS; RADIO RELAY SYSTEMS.) (*RADIO COMMUNICATION SYSTEMS; *MICROWAVE COMMUNICATION SYSTEMS; COMMUNICATION EQUIPMENT; COSTS; MATHEMATICAL ANALYSIS; SPECIFICATIONS.) RELIABILITY.
MINNEAPOLIS-HONEYWELL REGULATOR CO., SEATTLE, WASH.
AD-274 545 62-3-2 DIV. 5

(MILITARY OPERATIONS; *RADIO COMMUNICATION SYSTEMS; HIGH FREQUENCY; PROPAGATION; *SUNSPOTS; *IONOSPHERIC DISTURBANCES; NOISE (RADIO); STATISTICAL ANALYSIS.)
JANSKY AND BAILEY DIV., ATLANTIC RESEARCH CORP., WHEATON, MD.
AD-274 735 62-3-2 DIV. 5

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS, NEW YORK.
AD-274 840 62-3-2 DIV. 5

***RADIO INTERFERENCE**

(*TELEMETERING TRANSMITTERS WITH RADIOFREQUENCY FILTERS; FREQUENCY MODULATION; RADIOFREQUENCY POWER; *RADIO INTERFERENCE; *RADIOFREQUENCY SPECTRUM ANALYZERS; RELIABILITY; TESTS.) (TELEMETERING ANTENNAS; TRANSMISSION LINES; INTERFERENCE.) (TELEMETER SYSTEMS; COMMUNICATION EQUIPMENT; AIRCRAFT EQUIPMENT; GUIDED MISSILES; TEST FACILITIES; INSTRUMENTATION.)
ARMY SIGNAL MISSILE SUPPORT AGENCY; WHITE SANDS MISSILE RANGE; N. MEX.
AD-274 940 62-3-2 DIV. 6

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH.; LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***RADIO NAVIGATION**

(VERY LOW FREQUENCY; RADIO TRANSMITTERS; *ANTENNAS; *ANTENNA MASTS; MODEL TESTS; DESIGN; FEASIBILITY STUDIES.) (*RADIO NAVIGATION; AIR FORCE EQUIPMENT; *RADIO TOWERS; NEW YORK; ANTENNA RADIATION PATTERNS; RADIOFREQUENCY POWER; MEASUREMENT; TESTS.)
DECO ELECTRONICS; INC.; LEESBURG; VA.
AD-274 469 62-3-2 DIV. 8

***RADIO RELAY SYSTEMS**

(*PULSE MODULATION; *CODING; *RADIO RELAY SYSTEMS; *MICROWAVE RELAY SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (*AMPLITUDE MODULATION; *MULTIPLEX TRANSMISSION; NOISE (RADIO); SOURCES; SIGNAL-TO-NOISE RATIO; RADIOFREQUENCY; ERRORS; DISTORTION; ATTENUATION; DETECTORS; AUDIOFREQUENCY; MODULATION.)
RCA DEFENSE ELECTRONIC PRODUCTS; NEW YORK.
AD-274 840 62-3-2 DIV. 5

***RADIO SIGNALS**

(*COMMUNICATIONS THEORY; *RADIO SIGNALS; *RADIO WAVES; WAVE TRANSMISSION; HIGH FREQUENCY; ATTENUATION; PROPAGATION; IONOSPHERE MODELS; ANALYSIS; THEORY.) (ELECTROMAGNETIC WAVES; POLARIZATION; PLASMA PHYSICS; *MAGNETO-OPTIC ROTATION; PHASE SHIFTERS; *IONOSPHERIC PROPAGATION; MEASUREMENT; TEST EQUIPMENT; TEST METHODS.)
PAGE COMMUNICATIONS ENGINEERS, INC.; WASHINGTON, D. C.
AD-274 682 62-3-2 DIV. 8

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH.; LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***RADIO TOWERS**

(VERY LOW FREQUENCY; RADIO TRANSMITTERS; *ANTENNAS; *ANTENNA MASTS; MODEL TESTS; DESIGN; FEASIBILITY STUDIES.) (*RADIO NAVIGATION; AIR FORCE EQUIPMENT; *RADIO TOWERS; NEW YORK; ANTENNA RADIATION PATTERNS; RADIOFREQUENCY POWER; MEASUREMENT; TESTS.)
DECO ELECTRONICS; INC.; LEESBURG; VA.
AD-274 469 62-3-2 DIV. 8

***RADIO WAVES**

(*COMMUNICATIONS THEORY; *RADIO SIGNALS; *RADIO WAVES; WAVE TRANSMISSION; HIGH FREQUENCY; ATTENUATION; PROPAGATION; IONOSPHERE MODELS; ANALYSIS; THEORY.) (ELECTROMAGNETIC WAVES; POLARIZATION; PLASMA PHYSICS; *MAGNETO-OPTIC ROTATION; PHASE SHIFTERS; *IONOSPHERIC PROPAGATION; MEASUREMENT; TEST EQUIPMENT; TESY METHODS.)
PAGE COMMUNICATIONS ENGINEERS, INC.; WASHINGTON, D. C.
AD-274 682 62-3-2 DIV. 8

(*DYNAMICS; NONLINEAR SYSTEMS; THEORY OF *ELECTROMAGNETIC WAVES; PROPAGATION IN IONIZATION (IONIZED MEDIA).) (*RADIO WAVES; REFLECTION.) (ELECTRONS; DENSITY.) (*PLASMA PHYSICS; RESONANCE; PLASMA OSCILLATIONS; DIFFERENTIAL EQUATIONS; SPACE CHARGES.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 726 62-3-2 DIV. 25

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES.) (RADIO EQUIPMENT; EXTREMELY HIGH FREQUENCY.) (SOUND GENERATORS; ULTRASONIC RADIATION.)
EMERTRON; INC.; SILVER SPRING; MD.
AD-274 809 62-3-2 DIV. 8

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES.) (ULTRASONIC RADIATION; PROPAGATION; AIR; REFRACTIVE INDEX.) (SOUND GENERATORS; ULTRASONIC RADIATION.) (RADIO EQUIPMENT, EXTREMELY HIGH FREQUENCY.)
EMERTRON; INC.; SILVER SPRING; MD.
AD-274 810 62-3-2 DIV. 8

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH.; LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***RADIOFREQUENCY GENERATORS**

(*BACKWARD-WAVE OSCILLATORS; *RADIOFREQUENCY GENERATORS; PULSE TRANSFORMERS; PULSE GENERATORS; FEASIBILITY STUDIES; DESIGN; MANUFACTURING METHODS.) (MICROWAVES; WAVEGUIDES; ELECTRONIC CIRCUITS; MICROWAVE NETWORKS; SUPERHIGH FREQUENCY; ELECTROFORMING; STANDING WAVE RATIOS; MEASUREMENT.) (*ELECTRON TUBES; CATHODES (ELECTRON TUBES); ELECTRON GUNS; BEAM POWER TUBES; ANODES (ELECTRON TUBES); MAGNETIC FIELDS; FOCUSING; MATERIALS; TEST EQUIPMENT.)
WATKINS-JOHNSON CO.; PALO ALTO; CALIF.
AD-274 718 62-3-2 DIV. 9

***RADIOFREQUENCY POWER**

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN.) (*WAVEGUIDES; MICROWAVE FREQUENCY; RADAR DUPLEXERS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *MICROWAVE EQUIPMENT; GASES; PRESSURE; TEMPERATURE; COOLING BY CONVECTION; WAVEGUIDE FILTERS; SURFACE PROPERTIES; ANALYSIS.) (PROPAGATION; WAVE TRANSMISSION; ATTENUATION; ABSORPTION.)
MICROWAVE RESEARCH ASSOCIATES, INC.; BURLINGTON; MASS.
AD-274 819 62-3-2 DIV. 8

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN.) (*WAVEGUIDES; MICROWAVE FREQUENCY; CAVITY RESONATORS; *MICROWAVE EQUIPMENT; WAVEGUIDE COUPLERS; WAVEGUIDE IRISES; TEMPERATURE; PRESSURE; COOLING; FINS; CONVECTION; LIQUID COOLED; WAVEGUIDE FILTERS; HEAT TRANSFER; COOLANT; COOLANT PUMPS; HEAT EXCHANGERS.)
MICROWAVE ASSOCIATES; INC.; BURLINGTON; MASS.
AD-274 820 62-3-2 DIV. 8

(*WAVEGUIDES; C BAND; K BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (WAVEGUIDE JOINTS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *CAVITY RESONATORS; FREQUENCY SHIFT; TUNING DEVICES; ELECTRIC FIELDS; MAGNETONS; *RADIOFREQUENCY POWER; PRESSURE; GASES; AIR; MEASUREMENT; *MICROWAVES; TEMPERATURE; TEST EQUIPMENT; *HANDBOOKS.)
MICROWAVE ASSOCIATES; INC.; BURLINGTON; MASS.
AD-274 822 62-3-2 DIV. 8

***RADIOFREQUENCY SPECTRUM ANALYZERS**

(*NUCLEAR MAGNETIC RESONANCE; *RADIOFREQUENCY SPECTRUM ANALYZERS; DESIGN.) (OSCILLATORS; COILS; ELECTRONIC CIRCUITS; NARROWBAND; AMPLIFIERS AND LOCK-IN DETECTORS; MODULATORS; POWER SUPPLIES; STORAGE BATTERIES; DIRECT CURRENT.) SIGNAL-TO-NOISE RATIO; MALLINCKRODT CHEMICAL LAB.; HARVARD U.; CAMBRIDG MASS.
AD-274 519 62-3-2 DIV. 20

(*TELEMETERING TRANSMITTERS WITH RADIOFREQUENCY FILTERS; FREQUENCY MODULATION; RADIOFREQUENCY POWER; *RADIO INTERFERENCE; *RADIOFREQUENCY SPECTRUM ANALYZERS; RELIABILITY; TESTS.) (TELEMETERING ANTENNAS; TRANSMISSION LINES; INTERFERENCE.) (TELEMETER SYSTEMS; COMMUNICATION EQUIPMENT; AIRCRAFT EQUIPMENT; GUIDED MISSILES; TEST FACILITIES; INSTRUMENTATION.)
ARMY SIGNAL MISSILE SUPPORT AGENCY; WHITE SANDS MISSILE RANGE; N. MEX.
AD-274 940 62-3-2 DIV. 6

***RADIOGRAPHY**

(*URANIUM; URANIUM ALLOYS (92 WT.-%); STRUCTURES; QUALITY CONTROL; *RADIOGRAPHY; *INDUSTRIAL RADIOGRAPHY; NONDESTRUCTIVE TESTING; X-RAY PHOTOGRAPHY.) X RAYS; ABSORPTION; SCATTERING; SHIELDING; TEST METHODS.)
WATERTOWN ARSENAL LABS.; MASS.
AD-274 633 62-3-2 DIV. 17

***RADIOMETERS**

(DESIGN OF *RADIOMETERS FOR SENSING ULTRAVIOLET RADIATION AND BLACKBODY RADIATION FOR MEASUREMENT OF *SURFACE TEMPERATURES OF SOLIDS; FEASIBILITY STUDIES; HIGH TEMPERATURE RESEARCH.) (TESTS; MOLYBDENUM; CONTROLLED ATMOSPHERES; OXIDATION; NUCLEAR ENERGY; RADIATION EFFECTS.)
BARNES ENGINEERING CO.; STAMFORD; CONN.
AD-274 794 62-3-2 DIV. 25

***RADOMES**

(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; *RADOMES; TEST FACILITIES; DESIGN.) (*RADAR STATIONS; CONSTRUCTION; RADAR EQUIPMENT; COMMUNICATION EQUIPMENT; INSTRUMENTATION.) (SEARCH RADAR; RADAR TRACKING; MASERS.) (*HIGH PRESSURE RESEARCH; INSTRUMENTATION.) RADIOMETERS.
LINCOLN LAB., MASS. INST. OF TECH.; LEXINGTON.
AD-274 523 62-3-2 DIV. 8

(HIGH TEMPERATURE RESEARCH; *RADOMES; MATERIALS; REINFORCING MATERIALS; CERAMIC MATERIALS; CERAMIC FIBERS; ASBESTOS FIBER; MICA; ALUMINUM COMPOUNDS; PHOSPHATES; SILICON COMPOUNDS; DIOXIDES; GLASS; SPHERES; *LAMINATES; *BINDERS; FILAMENT WOUND CONSTRUCTION.) MECHANICAL PROPERTIES; DIELECTRIC PROPERTIES; VISCOSITY.
GENERAL ELECTRIC CO.; SCHENECTADY; N. Y.
AD-274 732 62-3-2 DIV. 8

***REACTION KINETICS**

(*REACTION KINETICS; *DISSOCIATION; *RECOMBINATION REACTIONS; *GASES; IONS; MOLECULES DURING *IONIZATION; MOLECULAR ROTATION; VIBRATION; RELAXATION TIME AT HIGH TEMPERATURE RESEARCH; ENERGY TRANSFER EXCITATION; ATOMIC ENERGY LEVELS; THEORY.)
SHOCK WAVES; ATMOSPHERE ENTRY.
CORNELL U. GRADUATE SCHOOL OF AERONAUTICAL ENGINEERING; ITHACA; N. Y.
AD-274 667 62-3-2 DIV. 4

(SHOCK WAVES; *GAS IONIZATION; PLASMA PHYSICS; *REACTION KINETICS; PHOTOEMISSION; LUMINESCENCE; ULTRAVIOLET RADIATION; CHEMICAL REACTIONS; *ACETYLENE WITH *OXYGEN; MIXTURES WITH ARGON; ADDITIVES; ACETONES; METHYL RADICALS; LEAD COMPOUNDS.) (OXIDATION; IONIZATION; TEST METHODS.)
GIBBS CHEMICAL LAB.; HARVARD U.; CAMBRIDGE; MASS.
AD-274 547 62-3-2 DIV. 4

(*FLUID MECHANICS; GASES; PARTICLES; *MIXTURES; *GAS FLOW; GAS IONIZATION; MAGNETOHYDRODYNAMICS; *PLASMA PHYSICS; PLASMA JETS; THERMODYNAMICS; *REACTION KINETICS; KINETIC THEORY; CHEMICAL REACTIONS; SURFACES; CATALYSIS.) (ALUMINUM; SOLID ROCKET PROPELLANTS; *COMBUSTION; FLARES.) *JET PROPULSION; RECOMBINATION REACTIONS.
JAMES FORRESTAL RESEARCH CENTER; PRINCETON U.; N. J.
AD-274 748 62-3-2 DIV. 9

***REACTOR SHIELDING MATERIALS**

(*SHIELDING; *REACTOR SHIELDING MATERIALS; NEUTRONS BY *ELASTOMERS; ORGANOBORANES; POLYMERS; DIENES; ALKYL RADICALS; *DECABORANES; STABILITY; CASTING; HYDROGEN; DENSITY; AGING.)
ROCK ISLAND ARSENAL LAB.; ILL.
AD-274 685 62-3-2 DIV. 20

***RECTIFIERS**

(*RECTIFIERS; *INVERTED RECTIFIERS; SILICON; SEMICONDUCTORS; ELECTRIC TRIGGER CONTROLS; *INVERTER CIRCUITS; *SWITCHING CIRCUITS; TRIGGER CIRCUITS; TRIGGERED GATES; PULSE GENERATORS; RELAXATION OSCILLATORS; OSCILLATOR CIRCUITS; DESIGN; THEORY.) (TRANSFORMERS; INDUCTANCE; MAGNETIC CORES; MATHEMATICAL ANALYSIS.)
ORDNANCE RESEARCH LAB.; PENNSYLVANIA STATE U.; UNIVERSITY PARK.
AD-274 497 62-3-2 DIV. 7

***REDUCTION**

(HYDRODYNAMICS; *DRAG; FRICTION; *REDUCTION; DAMPING; COATINGS; ELASTIC SHELLS; *UNDERWATER PROPULSION; TEST METHODS.) (*BOUNDARY LAYER; FLUID FLOW.)
UNITED STATES RUBBER CO.; WAYNE; N. J.
AD-274 628 62-3-2 DIV. 25

***RE-ENTRY VEHICLES**

(*RE-ENTRY VEHICLES; INSTRUMENTATION.) (*TRANSDUCERS; *PRESSURE; ATMOSPHERE; AIR.) (GASES; COMPRESSIBLE FLOW; SUPERAERODYNAMICS.) (PRESSURE GAGES; GASES.) TIME.
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER, LOS ANGELES.
AD-274 626 62-3-2 DIV. 30

***REFRACTIVE INDEX**

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U., (ITALY).
AD-274 728 62-3-2 DIV. 29

***REFRACTOMETERS**

(*ATMOSPHERE; SCATTERING AND ABSORPTION OF *MICROWAVES.) (MEASUREMENT OF THE *REFRACTIVE INDEX OF *NITROGEN AND *OXYGEN.) (INSTRUMENTATION; *REFRACTOMETERS; BAROMETERS.)
FLORENCE U., (ITALY).
AD-274 728 62-3-2 DIV. 29

***REFRACTORY MATERIALS**

(MATERIALS; ALLOYS FOR SOLID ROCKET PROPELLANTS; *ROCKET MOTORS; PREPARATION; TESTS.) (*REFRACTORY MATERIALS; REFRACTORY COATINGS; GRAPHITE; METALLIC COMPOUNDS; HALIDES; HYDROCARBONS; PYROLYSIS; DEPOSITS; VAPOR PLATING.) (BORON ALLOYS; MOLYBDENUM ALLOYS; TUNGSTEN ALLOYS; ZIRCONIUM ALLOYS; SILICON ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; MANGANESE ALLOYS; DENSITY; MICROSTRUCTURE; CRYSTAL STRUCTURE.) (*ROCKET MOTOR NOZZLES; MANUFACTURING METHODS; PHYSICAL PROPERTIES; THERMAL INSULATION; OXIDATION.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 522 62-3-2 DIV. 27

(*BIBLIOGRAPHY; *METALS; *HEAT RESISTANT ALLOYS; *CERAMIC MATERIALS; *REFRACTORY MATERIALS; ALLOYS.) (STEEL; STAINLESS STEEL; IRON ALLOYS; NICKEL ALLOYS; BERYLLIUM; TITANIUM; MAGNESIUM; NIOBIUM; CHROMIUM; MOLYBDENUM; TANTALUM; VANADIUM; TUNGSTEN.)
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO.
AD-274 649 62-3-2 DIV. 17

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION.) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS.) (*THORIUM COMPOUNDS; OXIDES.) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS.)
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
AD-274 654 62-3-2 DIV. 14

(CONFERENCES; THERMAL INSULATION; *REFRACTORY MATERIALS; *COMPOSITE MATERIALS.) (*CERAMIC MATERIALS; REFRACTORY COATINGS; CERAMIC COATINGS; METAL COATINGS; COATINGS; CERMETS; GRAPHITE; *METALS; MOLYBDENUM; NIOBIUM; TANTALUM; TUNGSTEN; VANADIUM; VANADIUM ALLOYS; MOLYBDENUM ALLOYS; NIOBIUM ALLOYS; TANTALUM ALLOYS; TUNGSTEN ALLOYS.) (REINFORCING MATERIALS; FIBERS; SINGLE CRYSTALS; CERAMIC FIBERS.) (GUIDED MISSILE NOSES; ROCKET MOTOR NOZZLES; ROCKET NOSES; RE-ENTRY VEHICLES.) ALLOYS; FLAME SPRAYING; PLASMA JETS; ABLATION; DISPERSION HARDENING.
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO
AD-274 804 62-3-2 DIV. 14

***RELATIVITY THEORY**

(*ALGEBRAIC TOPOLOGY; *RELATIVITY THEORY; *GEODESICS; PARTICLE TRAJECTORIES; LIGHT TRANSMISSION.) (*STATISTICAL TESTS; PARTIAL DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS).
RAND CORP., SANTA MONICA, CALIF.
AD-274 598 62-3-2 DIV. 15

(*GRAVITY; *RELATIVITY THEORY; ALGEBRAIC TOPOLOGY; TENSOR ANALYSIS; CALCULUS OF VARIATIONS.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 838 62-3-2 DIV. 15

***RESEARCH PROGRAM ADMINISTRATION**

(*RESEARCH PROGRAM ADMINISTRATION; HANDBOOKS; *OPERATIONS RESEARCH; MONITORS.) (COMPUTERS; *DATA PROCESSING SYSTEMS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 506 62-3-2 DIV. 30

***RESINS**

(*COMPOSITE MATERIALS; *LAMINATES; PLASTICS; GLASS TEXTILES; FIBERS; REINFORCING MATERIALS; *RESINS; DEFORMATION; CRAZING; MATHEMATICAL ANALYSIS; STRESSES.)
NAVAL RESEARCH LAB., WASHINGTON, D. C.
AD-274 560 62-3-2 DIV. 14

***RESONANCE**

(*QUANTUM MECHANICS; NUCLEAR MAGNETIC RESONANCE; *RESONANCE.) (SPIN; DENSITY; OSCILLATION; *MAGNETIC FIELDS; DIFFERENTIAL EQUATIONS.) THESES.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 740 62-3-2 DIV. 25

***RING WINGS**

(*RING *INGS; *WING BODY CONFIGURATIONS; WIND TUNNEL MODELS; AERODYNAMICS; SUPERSONICS; LIFT; DRAG; PITCH; MOMENTS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 586 62-3-2 DIV. 9

***ROCK**

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***ROCKET CASES**

(*ROCKET CASES; MANUFACTURING METHODS; DRAWING (MACHINE PROCESSING); HEAT TREATMENT; MACHINE TOOLS; METAL FORMING PRESSES; DIES.) (ALLOYS; METALS; *STEEL (300-M); *TITANIUM ALLOYS; NICKEL ALLOYS; COBALT ALLOYS; MOLYBDENUM ALLOYS.)
LYON, INC., DETROIT, MICH.
AD-274 828 62-3-2 DIV. 27

***ROCKET FUELS**

(*AVIATION FUELS; *JET ENGINE FUELS; *ROCKET FUELS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; THERMODYNAMICS; HANDBOOKS.) (SOLUBILITY OF AIR; NITROGEN; ETHANES.) (HYDROCARBONS; NAPHTHALENES.) VISCOSITY; DENSITY; SPECIFIC HEAT; ENTHALPY; ENTROPY; VAPORIZATION.
INGLEWOOD LAB., THOMPSON PRODUCTS, INC., CALIF.
AD-274 623 62-3-2 DIV. 10

***ROCKET MOTOR NOZZLES**

(MATERIALS; ALLOYS FOR SOLID ROCKET PROPELLANTS; *ROCKET MOTORS; PREPARATION; TESTS.) (*REFRACTORY MATERIALS; REFRACTORY COATINGS; GRAPHITE; METALLIC COMPOUNDS; HALIDES; HYDROCARBONS; PYROLYSIS; DEPOSITS; VAPOR PLATING.) (BORON ALLOYS; MOLYBDENUM ALLOYS; TUNGSTEN ALLOYS; ZIRCONIUM ALLOYS; SILICON ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; MANGANESE ALLOYS; DENSITY; MICROSTRUCTURE; CRYSTAL STRUCTURE.) (*ROCKET MOTOR NOZZLES; MANUFACTURING METHODS; PHYSICAL PROPERTIES; THERMAL INSULATION; OXIDATION.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 522 62-3-2 DIV. 27

(ROCKET MOTORS; SOLID ROCKET PROPELLANTS; EXHAUST GASES; *HEAT TRANSFER TO *ROCKET MOTOR NOZZLES; TESTS.) (PARTICLES; DROPS; DEPOSITS OF ALUMINUM COMPOUNDS; OXIDES.) TEMPERATURE; THERMAL INSULATION; THEORY; MATHEMATICAL ANALYSIS; EQUATIONS.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
AD-274 648 62-3-2 DIV. 27

***ROCKET MOTORS**

(MATERIALS; ALLOYS FOR SOLID ROCKET PROPELLANTS; *ROCKET MOTORS; PREPARATION; TESTS.) (*REFRACTORY MATERIALS; REFRACTORY COATINGS; GRAPHITE; METALLIC COMPOUNDS; HALIDES; HYDROCARBONS; PYROLYSIS; DEPOSITS; VAPOR PLATING.) (BORON ALLOYS; MOLYBDENUM ALLOYS; TUNGSTEN ALLOYS; ZIRCONIUM ALLOYS; SILICON ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; MANGANESE ALLOYS; DENSITY; MICROSTRUCTURE; CRYSTAL STRUCTURE.) (*ROCKET MOTOR NOZZLES; MANUFACTURING METHODS; PHYSICAL PROPERTIES; THERMAL INSULATION; OXIDATION.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 522 62-3-2 DIV. 27

(*ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; MATERIALS; BINDERS; *HEAT RESISTANT POLYMERS; *COMPOSITE MATERIALS; SILICONE RESINS; *EPOXY RESINS; *PHENOLIC RESINS; ASBESTOS FIBERS; REINFORCING MATERIALS; MECHANICAL PROPERTIES; TESTS; AGING.) (PHTHALIC ANHYDRIDES; ANHYDRIDES; FURAN; CYANAMIDES; CYANURIC ACID; ESTERS; HETEROCYLIC COMPOUNDS; RESINS; CASTOR OIL.)
ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
AD-274 933 62-3-2 DIV. 14

***RODS**

(*RODS; *ELASTICITY; *STABILITY; MECHANICAL PROPERTIES; STRESSES; DEFORMATION; THEORY; BEAMS; MATHEMATICAL ANALYSIS.) MECHANICS; APPLIED MECHANICS.
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 753 62-3-2 DIV. 25

***ROTATING STRUCTURES**

(MECHANICAL ENGINEERING; *ROTATING STRUCTURES; RODS; *VIBRATION; *ELASTICITY; NONLINEAR SYSTEMS.) (ENERGY; DAMPING; RODS.)
USSR.
MINNESOTA U., MINNEAPOLIS.
AD-274 743 62-3-2 DIV. 25

***RUBIDIUM COMPOUNDS**

(*SINGLE CRYSTALS; *CRYSTALS; MICA; THIN FILMS; GROWTH; *CRYSTALLIZATION; ZONE MELTING; MANUFACTURING METHODS; CRYSTAL GROWTH; LABORATORY EQUIPMENT; *BIBLIOGRAPHY.) (PRODUCTION; SHEETS; SOLIDS; SOLUTIONS; *POTASSIUM COMPOUNDS; ALUMINUM COMPOUNDS; *RUBIDIUM COMPOUNDS; BORON COMPOUNDS; *FLUORIDES; *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***RUBY**

(*BIBLIOGRAPHY; *CRYSTALS; GROWTH; PREPARATION; LASERS.) (*GARNET; *RUBY; *CORUNDUM; *SPINELS; SAPPHIRES; FERRITES; METALLIC COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE; SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 642 62-3-2 DIV. 14

***SAFETY VALVES**

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS.) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE.) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO.; GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

***SATELLITE ATTITUDE**

(*SATELLITE ATTITUDE; YAW; DETECTION BY EJECTION OF SATELLITE VEHICLES FROM *SATELLITE VEHICLES; *CELESTIAL MECHANICS; PERTURBATION THEORY.)
GENERAL DYNAMICS/CONVAIR; SAN DIEGO, CALIF.
AD-274 476 62-3-2 DIV. 12

***SATELLITE VEHICLE RESEARCH**

(*CIRCUITS; DESIGN; *TRANSDUCERS; *PROTON ACCELERATORS.) (CESIUM COMPOUNDS; IODIDES; CRYSTALS.) (INSTRUMENTATION; ELECTRON MULTIPLIERS; PHOTOTUBES.) (*SATELLITE VEHICLE RESEARCH; FLIGHT PATHS; FLIGHT TESTING.)
AEROSPACE CORP.; LOS ANGELES, CALIF.
AD-274 702 62-3-2 DIV. 30

***SATELLITE VEHICLES**

(*SATELLITE ATTITUDE; YAW; DETECTION BY EJECTION OF SATELLITE VEHICLES FROM *SATELLITE VEHICLES; *CELESTIAL MECHANICS; PERTURBATION THEORY.)
GENERAL DYNAMICS/CONVAIR; SAN DIEGO, CALIF.
AD-274 476 62-3-2 DIV. 12

(*SATELLITE VEHICLES; *BOOSTER ROCKETS; FUEL SYSTEMS; *LIQUID ROCKET PROPELLANTS.) (*PROPELLANT TANKS; TEMPERATURE CONTROL; VENTILATION; SPACE ENVIRONMENTAL CONDITIONS; WEIGHTLESSNESS; ACCELERATION.) (ROCKET FUELS; ROCKET OXIDIZERS; SURFACE PROPERTIES; SURFACE TENSION.) GAS PRESSURIZATION SYSTEMS.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE, CALIF.
AD-274 482 62-3-2 DIV. 27

(INSTRUMENTATION OF *SATELLITE VEHICLES; SPACE PROBES FOR MEASUREMENT OF *IONOSPHERE; *SPACE ENVIRONMENTAL CONDITIONS INCLUDING PARTICLES; IONS; ELECTRONS; DENSITY; TEMPERATURE.) (*GEOPHYSICS; TERRESTRIAL MAGNETISM; PLASMA PHYSICS; TESTS.) (FLIGHT TESTING OF SATELLITE ATTITUDE; DETECTORS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 963 62-3-2 DIV. 2

(*SATELLITE VEHICLES; INSTRUMENTATION; *ELECTROMETERS FOR MEASUREMENT OF ELECTROSTATIC FIELDS; IONS; PLASMA PHYSICS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 568 62-3-2 DIV. 12

(*SATELLITE VEHICLES; PNEUMATIC DEVICES; SPHERES FOR DETERMINATION OF UPPER ATMOSPHERE; ATMOSPHERE; DENSITY FROM LIFE EXPECTANCY.) (POLYMERS; ETHYLENES.) (ALUMINUM FOILS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 579 62-3-2 DIV. 12

(*VAN ALLEN RADIATION BELT; *SATELLITE VEHICLES; *ELECTROSTATIC FIELDS; ELECTRIC POTENTIAL; PROTONS; ELECTRONS.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 599 62-3-2 DIV. 2

(*SATELLITE VEHICLES; *SPACESHIPS; *HYPERVELOCITY VEHICLES; LUNAR VEHICLES; HAZARDS TO HIGH ALTITUDE; *SPACE ENVIRONMENTAL CONDITIONS; UPPER ATMOSPHERE.) (PRESSURE; DENSITY; TEMPERATURE; SOLAR ENERGY; ELECTROMAGNETIC WAVES; COSMIC RAYS; VAN ALLEN RADIATION BELT; PLASMA PHYSICS; AURORAE; MAGNETIC FIELDS; TERRESTRIAL MAGNETISM.) (AIRFRAMES; MATERIALS; PLASTICS; CERAMIC MATERIALS; ORGANIC MATERIALS; METALS; ALLOYS; CONTROL SYSTEMS; ELECTRONIC EQUIPMENT; ELECTRICAL EQUIPMENT; COMMUNICATION SYSTEMS; AUXILIARY POWER PLANTS; CLOSED-CYCLE ECOLOGICAL SYSTEMS.) (SHOCK; AERODYNAMIC HEATING; METEORITES.)
RADIO CORP. OF AMERICA; CAMDEN, N. J.
AD-274 641 62-3-2 DIV. 12

***SCATTERING**

(*SCATTERING; *ELECTROMAGNETIC WAVES; *TARGETS; *LOW FREQUENCY.) (QUANTUM MECHANICS; PARTIAL DIFFERENTIAL EQUATIONS; POLYNOMIALS; METAMATHEMATICS; NONLINEAR SYSTEMS.)
RADIATION LAB., U. OF MICHIGAN; ANN ARBOR.
AD-274 528 62-3-2 DIV. 25

(*ELECTROMAGNETIC WAVES; *SCATTERING; PLASMA PHYSICS; GAS IONIZATION.) (SURFACE TO SURFACE; GUIDED MISSILES; INTERCEPTION; INTERCEPTION PROBABILITIES; RE-ENTRY VEHICLES.) (ELECTRON BEAMS; RE-ENTRY AERODYNAMICS; IONIZATION; SHOCK TUBES; ELECTRIC DISCHARGES.) MAGNETOHYDRODYNAMICS; ANTIAIRCRAFT DEFENSE SYSTEMS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 610 62-3-2 DIV. 18

(*SCATTERING; *ELECTROMAGNETIC WAVE REFLECTIONS; SURFACES; CYLINDRICAL BODIES.) (ELECTROMAGNETIC WAVES; BOUNDARY LAYER; ELECTRONS; PHYSICS.)
CHALMERS U. OF TECH. (SWEDEN).
AD-274 725 62-3-2 DIV. 25

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES.) (RADIO EQUIPMENT; EXTREMELY HIGH FREQUENCY.) (SOUND GENERATORS; ULTRASONIC RADIATION.)
EMERTRON; INC., SILVER SPRING, MD.
AD-274 809 62-3-2 DIV. 8

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES.) (ULTRASONIC RADIATION; PROPAGATION; AIR; REFRACTIVE INDEX.) (SOUND GENERATORS; ULTRASONIC RADIATION.) (RADIO EQUIPMENT, EXTREMELY HIGH FREQUENCY.)
EMERTRON; INC., SILVER SPRING, MD.
AD-274 810 62-3-2 DIV. 8

***SCHEDULING**

(COMMUNICATION SYSTEMS; ANALYSIS; PROBABILITY; *COMBINATORIAL ANALYSIS; *COMPLEX VARIABLES; *SCHEDULING; *MANAGEMENT ENGINEERING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 997 62-3-2 DIV. 5

***SCHLIEREN PHOTOGRAPHY**

(*WIRE; *DETONATION; *PROPULSION; *PROPELLANTS; GAS DISCHARGES; SATELLITE VEHICLE RESEARCH.) (INSTRUMENTATION; PHOTOMULTIPLIERS; *SCHLIEREN PHOTOGRAPHY; SPECTROGRAPHIC CAMERAS.) (FEASIBILITY STUDIES; TESTS.)
AEROSPACE CORP.; EL SEGUNDO, CALIF.
AD-274 643 62-3-2 DIV. 25

***SCIENTIFIC RESEARCH**

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM; THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 504 62-3-2 DIV. 25

***SEISMIC WAVES**

(*SEISMIC WAVES; MATHEMATICAL ANALYSIS; DIGITAL COMPUTERS; *PROGRAMMING; *BIBLIOGRAPHY.)
ACOUSTICS AND SEISMICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 659 62-3-2 DIV. 30

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY; ROLLA.
AD-274 825 62-3-2 DIV. 13

***SELENIDES**

(*INTERMETALLIC COMPOUNDS; SEMICONDUCTORS; CRYSTALS; SINGLE CRYSTALS; *THERMOELECTRICITY; *LEAD COMPOUNDS; BARIUM COMPOUNDS; TIN COMPOUNDS; *TELLURIDES; *SELENIDES; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; PHASE STUDIES.) SOLID STATE PHYSICS; ELECTRONICS; ALLOYS.
NEW YORK U., N. Y.
AD-274 498 62-3-2 DIV. 25

***SEMICONDUCTING FILMS**

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; THIN FILMS; SINGLE CRYSTALS; *GERMANIUM; SILICON; SURFACES; SURFACE PROPERTIES; PREPARATION; ULTRAVIOLET RADIATION; *CATALYSIS; CHEMICAL REACTIONS; OXIDATION; BENZALDEHYDES TO BENZOIC ACIDS; ELECTRICAL PROPERTIES; IMPEDANCE; ELECTRIC POTENTIAL.) (TEST EQUIPMENT; METERS; RESISTANCE; MEASUREMENT.) *CRYSTAL RECTIFIERS.
RADLEY, J. A., RESEARCH INST., CAMDEN, N. J.
AD-274 736 62-3-2 DIV. 8

***SEMICONDUCTORS**

(*SEMICONDUCTORS; *INTERMETALLIC COMPOUNDS; CRYSTALS; *SINGLE CRYSTALS; ALLOYS; *LEAD ALLOYS; *TELLURIUM ALLOYS; TELLURIDES.) (*PHASE STUDIES; TEMPERATURE; VAPOR PRESSURE; THERMODYNAMICS; THEORY.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 496 62-3-2 DIV. 17

(*TRANSPORT PROPERTIES IN *SEMICONDUCTORS OF LEAD; *TELLURIUM COMPOUNDS.) (MAGNETIC FIELDS; *THERMAL CONDUCTIVITY; TEMPERATURE; MEASUREMENT; THERMOELECTRICITY.) (SCATTERING; RELAXATION TIME; LATTICES.)
ENERGY CONVERSION AND SEMICONDUCTOR LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 541 62-3-2 DIV. 25

(*DIODES; TRANSISTORS; *SEMICONDUCTORS; DESIGN; *MANUFACTURING METHODS.) (CRYSTALS; *SINGLE CRYSTALS; LATTICES; GROWTH; THIN FILMS; SILICON; DEPOSITS; THICKNESS.) (CHEMICAL IMPURITIES; CONTROL; DETERMINATION; DIFFUSION.) (THIN FILMS; MEASUREMENT BY INFRARED SPECTROSCOPY.)
SYLVANIA ELECTRIC PRODUCTS, INC.; WOBURN, MASS.
AD-274 621 62-3-2 DIV. 8

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; THIN FILMS; SINGLE CRYSTALS; *GERMANIUM; SILICON; SURFACES; SURFACE PROPERTIES; PREPARATION; ULTRAVIOLET RADIATION; *CATALYSIS; CHEMICAL REACTIONS; OXIDATION; BENZALDEHYDES TO BENZOIC ACIDS; ELECTRICAL PROPERTIES; IMPEDANCE; ELECTRIC POTENTIAL.) (TEST EQUIPMENT; METERS; RESISTANCE; MEASUREMENT.) *CRYSTAL RECTIFIERS.
RADLEY, J. A., RESEARCH INST., CAMDEN, N. J.
AD-274 736 62-3-2 DIV. 8

(*TRANSISTORS; SILICON; HIGH FREQUENCY; *SEMICONDUCTORS; *MANUFACTURING METHODS; PRODUCTION; PROCESSING.) (CRYSTALS; SILICON; CHEMICAL IMPURITIES; DIFFUSION; ETHYL RADICALS; SILICATES; PROPYL RADICALS; BORATES; PHOSPHORUS COMPOUNDS; OXYCHLORIDES; INDUCTANCE.) *PACKAGED CIRCUITS; DESIGN; THEORY.
PACIFIC SEMICONDUCTORS, INC., LAWNDALE, CALIF.
AD-274 833 62-3-2 DIV. 8

(*KINETIC THEORY OF DISPERSION OF *SEMICONDUCTORS; LEAD COMPOUNDS; SULFIDES; ZINC COMPOUNDS; OXIDES IN CONCENTRATED NITRIC ACID AND AQUEOUS SOLUTIONS OF HYDROCHLORIC ACID.) (DOPING OF SILVER COMPOUNDS; SULFIDES; BISMUTH COMPOUNDS; NICKEL COMPOUNDS; ALUMINUM COMPOUNDS; LITHIUM COMPOUNDS.) CHEMICAL REACTIONS.
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 848 62-3-2 DIV. 8

***SHEAR STRESSES**

(FREE SURFACES OF *ELASTICITY; *SOLIDS AT SUPERSONICS; VELOCITY; VIBRATION; *STRESSES; *SHEAR STRESSES; LOADING; LOAD DISTRIBUTION.) (*PARTIAL DIFFERENTIAL EQUATIONS; TIME.)
MATHEMATICS RESEARCH CENTER; U. OF WISCONSIN, MADISON.
AD-274 849 62-3-2 DIV. 25

***SHELTERS**

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS.) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE.) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY; ROLLA.
AD-274 825 62-3-2 DIV. 13

***SHIELDING**

(*SHIELDING; *REACTOR SHIELDING MATERIALS; NEUTRONS BY *ELASTOMERS; ORGANOBORANES; POLYMERS; DIENES; ALKYL RADICALS; *DECABORANES; STABILITY; CASTING; HYDROGEN; DENSITY; AGING.)
ROCK ISLAND ARSENAL LAB., ILL.
AD-274 685 62-3-2 DIV. 20

***SHOCK TUBES**

(*PLASMA PHYSICS; GAS IONIZATION OF *CESIUM; VAPORS BY *SHOCK TUBES.) (MEASUREMENT; TEMPERATURE; PRESSURE; DENSITY; EXPERIMENTAL DATA; CALIBRATION; INSTRUMENTATION; DESIGN; PHOTOGRAPHIC ANALYSIS.) (THERMODYNAMICS AND HYDRODYNAMICS; EQUATIONS.)
PRINCETON U., N. J.
AD-274 672 62-3-2 DIV. 25

***SHOCK WAVES**

(*BLUNT BODIES; HYPERSONICS; SUPERSONICS; AERODYNAMICS; *SHOCK WAVES; MATHEMATICAL ANALYSIS; SERIES; INTEGRAL EQUATIONS; DIFFERENTIAL EQUATIONS; THEORY.)
STANFORD U., CALIF.
AD-274 612 62-3-2 DIV. 9

(*SPECTROGRAPHIC ANALYSIS; SHOCK TUBES; *SHOCK WAVES; *GAS IONIZATION; GAS DISCHARGES; PLASMA JETS; *HYDROGEN; IMPURITIES.) (ELECTROMAGNETIC WAVES; *SPECTROGRAPHIC DATA; INTENSITY; WAVE ANALYSIS; MOLECULAR SPECTROSCOPY; GASES.) (LABORATORY EQUIPMENT; INSPECTION WINDOWS; QUARTZ.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 706 62-3-2 DIV. 25

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY, STABILITY AND *GEOLOGY.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS.) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING, DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES.) (*GEOPHYSICAL PROSPECTING, THEORY; TEST METHODS.) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION.) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

***SIGNALS**

(*STATISTICAL PROCESSES OF TIME; *SIGNALS IN A *COMMUNICATIONS SYSTEM.) (CORRELATION TECHNIQUES OF LINEAR SYSTEMS AND NON-LINEAR SYSTEMS; COMPUTERS; PROGRAMMING; ERRORS.) (WAVE TRANSMISSION; VECTOR ANALYSIS; INTEGRAL EQUATIONS; OPERATORS (MATHEMATICS); MATRIX ALGEBRA; INTEGRAL TRANSFORMS; SEQUENCES.) (DATA TRANSMISSION SYSTEMS; COMMUNICATIONS THEORY; RADIO SIGNALS; WAVE ANALYSIS.)
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 492 62-3-2 DIV. 8

***SILICON COMPOUNDS**

(*HEAT RESISTANT POLYMERS; *ELASTOMERS; *SILICON COMPOUNDS; *NITROGEN COMPOUNDS; SYNTHESIS.) (POLYMERS; CHLORINE COMPOUNDS; METHYL RADICALS; PHENYL RADICALS; SILANES; AZO RADICALS; CYCLOPENTANES; CYCLOHEXANES; PROPYL RADICALS; AMINES.) (POLYMERIZATION; MOLECULAR STRUCTURE; VISCOSITY; MOLECULAR WEIGHT.) INFRARED SPECTROSCOPY; CHEMICAL ANALYSIS.
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 489 62-3-2 DIV. 4

(*POLYMERS; *ELASTOMERS; *SILICON COMPOUNDS; *NITROGEN COMPOUNDS; *AMINES; AZO RADICALS; SYNTHESIS; *POLYMERIZATION; CHEMICAL REACTIONS.) (STABILITY; TEMPERATURE; HYDROLYSIS.) (METHYL RADICALS; SILICONES; HETEROCYCLIC COMPOUNDS; ETHYL RADICALS; PHENYL RADICALS; OXYGEN COMPOUNDS; VINYL RADICALS; CHLORIDES.)
MALLINCKRODT CHEMICAL LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 520 62-3-2 DIV. 4

***SINGLE CRYSTALS**

(*SEMICONDUCTORS; *INTERMETALLIC COMPOUNDS; CRYSTALS; *SINGLE CRYSTALS; ALLOYS; *LEAD ALLOYS; *TELLURIUM ALLOYS; TELLURIDES.) (*PHASE STUDIES; TEMPERATURE; VAPOR PRESSURE; THERMODYNAMICS; THEORY.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 496 62-3-2 DIV. 17

(*DIODES; TRANSISTORS; *SEMICONDUCTORS; DESIGN; *MANUFACTURING METHODS.) (CRYSTALS; *SINGLE CRYSTALS; LATTICES; GROWTH; THIN FILMS; SILICON; DEPOSITS; THICKNESS.) (CHEMICAL IMPURITIES; CONTROL; DETERMINATION; DIFFUSION.) (THIN FILMS; MEASUREMENT BY INFRARED SPECTROSCOPY.)
SYLVANIA ELECTRIC PRODUCTS, INC., WOBURN, MASS.
AD-274 631 62-3-2 DIV. 8

(*SINGLE CRYSTALS; *CRYSTALS; MICA; THIN FILMS; GROWTH; *CRYSTALLIZATION; ZONE MELTING, MANUFACTURING METHODS; CRYSTAL OVENS; LABORATORY EQUIPMENT; *BIBLIOGRAPHY.) (PRODUCTION; SHEETS; SOLIDS; SOLUTIONS; *POTASSIUM COMPOUNDS; ALUMINUM COMPOUNDS; *RUBIDIUM COMPOUNDS; BORON COMPOUNDS; *FLUORIDES; *ALUMINATES.)
PENNSALT CHEMICALS CORP., PHILADELPHIA, PA.
AD-274 832 62-3-2 DIV. 26

***SINGLE CRYSTALS (METALLURGY)**

(*ACOUSTICS; *DEFORMATION; *SINGLE CRYSTALS (METALLURGY); ALUMINUM; MEASUREMENT; WAVE TRANSMISSION; STRESSES.)
LESSELLS AND ASSOCIATES, INC., BOSTON, MASS.
AD-274 484 62-3-2 DIV. 17

***SINTERING**

(PRODUCTION; *MOLYBDENUM ALLOYS; TITANIUM ALLOYS; SHEETS; *POWDER METALLURGY; CONTROLLED ATMOSPHERES; VACUUM FURNACES; *SINTERING.) (ADDITIVES; CARBON; HYDROGEN; NITROGEN; OXYGEN; HEAT TREATMENT; HARDENING; DISPERSION HARDENING; TITANIUM COMPOUNDS; CARBIDES; NITRIDES; OXIDES.) (ALLOYS; HEAT RESISTANT ALLOYS; POWDER ALLOYS; POWDER METALS; HARDNESS; MICROSTRUCTURE; TENSILE PROPERTIES; PROCESSING.)
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
AD-274 611 62-3-2 DIV. 17

***SLOT ANTENNAS**

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM, THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB., CORONA, CALIF.
AD-274 504 62-3-2 DIV. 25

***SOLAR CELLS**

(*SOLAR CELLS; MATERIALS; DESIGN; INSTALLATION; FEASIBILITY STUDIES; MODEL TESTS.) (*COATINGS; EPOXY RESINS; SILICONE RESINS.) (PHYSICAL PROPERTIES; STABILIZATION; CLIMATIC FACTORS; VIBRATION; WIND; GUSTS; LOAD DISTRIBUTION.) (ELECTRICAL PROPERTIES; DIODES; STORAGE BATTERIES; RESISTANCE; LIGHT TRANSMISSION.)
HAMILTON STANDARD DIV., UNITED AIRCRAFT CORP., WINDSOR LOCKS, CONN.
AD-274 478 62-3-2 DIV. 8

(*SOLAR CELLS; PHOTOELECTRIC CELLS; THIN FILMS; MATERIALS; RADIATION DAMAGE.) (SINGLE CRYSTALS; CADMIUM COMPOUNDS; SULFIDES; RELIABILITY; ADHESIVES; COATINGS; AIRBORNE; PLASTICS.) (*ELECTRIC POWER PRODUCTION; POWER SUPPLIES.)
RCA DEFENSE ELECTRONIC PRODUCTS, PRINCETON, N. J.
AD-274 841 62-3-2 DIV. 7

***SOLENOIDS**

(*MAGNETIC FIELDS; INTENSITY STUDIES ALONG THE AXIS OF *COILS; *SOLENOIDS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 570 62-3-2 DIV. 25

***SOLID ROCKET PROPELLANTS**

(*SOLID ROCKET PROPELLANTS; PROPELLANT GRAINS; *COMBUSTION; FLAMES; PRESSURE; TEMPERATURE; MEASUREMENT; THEORY; TESTS; PHOTOGRAPHIC ANALYSIS; PHOTOGRAPHY.) THERMOCOUPLE PYROMETERS; THERMOCOUPLES; BINDERS; POLYMERS; BUTADIENES; ACRYLIC RESINS; SULFIDES; AMMONIUM RADICALS; PERCHLORATES; HIGH PRESSURE RESEARCH.
PRINCETON U., N. J.
AD-274 591 62-3-2 DIV. 10

(*SOLID ROCKET PROPELLANTS; *PROPELLANT GRAINS; TEMPERATURE; PRESSURE; *IGNITION; FLAMES; *COMBUSTION; FLAME PROPAGATION; THEORY; TESTS; MATHEMATICAL ANALYSIS; EQUATIONS.) SHOCK TUBES.
UTAH U., SALT LAKE CITY.
AD-274 624 62-3-2 DIV. 10

***SOLID STATE PHYSICS**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY, THEORY OF *SOLIDS.) (*MECHANICS; SHEAR STRESSES; LOAD DISTRIBUTION; DEFORMATION; DYNAMICS; POTENTIAL THEORY; KINETIC THEORY.) (*SOLID STATE PHYSICS; CRYSTALS; METALLIC CRYSTALS.)
LABORATORY FOR INSULATION RESEARCH; MASS. INST. OF TECH., CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

***SOLIDS**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *INTEGRATION OF THE *ELASTICITY, THEORY OF *SOLIDS.) (*MECHANICS; SHEAR STRESSES; LOAD DISTRIBUTION; DEFORMATION; DYNAMICS; POTENTIAL THEORY; KINETIC THEORY.) (*SOLID STATE PHYSICS; CRYSTALS; METALLIC CRYSTALS.)
LABORATORY FOR INSULATION RESEARCH; MASS. INST. OF TECH., CAMBRIDGE.
AD-274 488 62-3-2 DIV. 25

(FREE SURFACES OF *ELASTICITY; *SOLIDS AT SUPERSONICS; VELOCITY; VIBRATION; *STRESSES; *SHEAR STRESSES; LOADING; LOAD DISTRIBUTION.) (*PARTIAL DIFFERENTIAL EQUATIONS; TIME.)
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
AD-274 849 62-3-2 DIV. 25

***SOLUTIONS**

(LIQUIDS; *SOLUTIONS; MAGNESIUM COMPOUNDS; SULFATES; WATER; ETHYLENES; DIOXIDES; *SOUND; *ABSORPTION; *ACOUSTIC INSULATION; PRESSURE; DIELECTRICS; CHEMICAL REACTIONS; RELAXATION TIME.) TEST EQUIPMENT, ACOUSTICS RESEARCH LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 814 62-3-2 DIV. 25

***SONAR**

(MATHEMATICAL PREDICTION FOR *DETECTION OF *SONAR SIGNALS; SIGNAL-TO-NOISE RATIO; UNDERWATER SOUND SIGNAL.) (*SONAR; SONAR EQUIPMENT; SONAR RECEIVERS; DESIGN.) (UNDERWATER SOUND; UNDERWATER SOUND TRANSMISSION; *UNDERWATER SOUND SIGNAL; DETECTION.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 900 62-3-2 DIV. 6

***SONAR SIGNALS**

(MATHEMATICAL PREDICTION FOR *DETECTION OF *SONAR SIGNALS; SIGNAL-TO-NOISE RATIO; UNDERWATER SOUND SIGNAL.) (*SONAR; SONAR EQUIPMENT; SONAR RECEIVERS; DESIGN.) (UNDERWATER SOUND; UNDERWATER SOUND TRANSMISSION; *UNDERWATER SOUND SIGNAL; DETECTION.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 900 62-3-2 DIV. 6

***SOUND**

(LIQUIDS; *SOLUTIONS; MAGNESIUM COMPOUNDS; SULFATES; WATER; ETHYLENES; DIOXIDES; *SOUND; *ABSORPTION; *ACOUSTIC INSULATION; PRESSURE; DIELECTRICS; CHEMICAL REACTIONS; RELAXATION TIME.) TEST EQUIPMENT, ACOUSTICS RESEARCH LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 814 62-3-2 DIV. 25

***SOUNDING ROCKETS**

*SOUNDING ROCKETS. (CLOUDS; *AERIAL PHOTOGRAPHY; INSTRUMENTATION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 564 62-3-2 DIV. 24

(*SPACE PROBES; *SOUNDING ROCKETS; WIND TUNNEL MODELS; SUBSONIC FLOW; SUPERSONICS; STABILITY (LONGITUDINAL); PITCH; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 573 62-3-2 DIV. 9

***SPACE ENVIRONMENTAL CONDITIONS**

(INSTRUMENTATION OF *SATELLITE VEHICLES; SPACE PROBES FOR MEASUREMENT OF *IONOSPHERE; *SPACE ENVIRONMENTAL CONDITIONS INCLUDING PARTICLES, IONS, ELECTRONS, DENSITY, TEMPERATURE.) (*GEOPHYSICS; TERRESTRIAL MAGNETISM, PLASMA PHYSICS, TESTS.) (FLIGHT TESTING OF SATELLITE ATTITUDE DETECTORS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 563 62-3-2 DIV. 2

(*SATELLITE VEHICLES; *SPACESHIPS; *HYPERVELOCITY VEHICLES; LUNAR VEHICLES; HAZARDS TO HIGH ALTITUDE; *SPACE ENVIRONMENTAL CONDITIONS; UPPER ATMOSPHERE.) (PRESSURE; DENSITY; TEMPERATURE; SOLAR ENERGY; ELECTROMAGNETIC WAVES; COSMIC RAYS; VAN ALLEN RADIATION BELT; PLASMA PHYSICS; AURORAE; MAGNETIC FIELDS; TERRESTRIAL MAGNETISM.) (AIRFRAMES; MATERIALS; PLASTICS; CERAMIC MATERIALS; ORGANIC MATERIALS; METALS; ALLOYS; CONTROL SYSTEMS; ELECTRONIC EQUIPMENT; ELECTRICAL EQUIPMENT; COMMUNICATION SYSTEMS; AUXILIARY POWER PLANTS; CLOSED-CYCLE ECOLOGICAL SYSTEMS.) (SHOCK; AERODYNAMIC HEATING; METEORITES.)
RADIO CORP. OF AMERICA, CAMDEN, N. J.
AD-274 841 62-3-2 DIV. 12

***SPACE FLIGHT**

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT.) (ULTRA HIGH FREQUENCY; *RADIO WAVES; *WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION.) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT.) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS.) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO.) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

***SPACE PROBES**

(*SPACE PROBES; *SOUNDING ROCKETS; WIND TUNNEL MODELS; SUBSONIC FLOW; SUPERSONICS; STABILITY (LONGITUDINAL); PITCH; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 575 62-3-2 DIV. 9

***SPACESHIPS**

(*SATELLITE VEHICLES; *SPACESHIPS; *HYPERVELOCITY VEHICLES; LUNAR VEHICLES; HAZARDS TO HIGH ALTITUDE; *SPACE ENVIRONMENTAL CONDITIONS; UPPER ATMOSPHERE.) (PRESSURE; DENSITY; TEMPERATURE; SOLAR ENERGY; ELECTROMAGNETIC WAVES; COSMIC RAYS; VAN ALLEN RADIATION BELT; PLASMA PHYSICS; AURORAE; MAGNETIC FIELDS; TERRESTRIAL MAGNETISM.) (AIRFRAMES; MATERIALS; PLASTICS; CERAMIC MATERIALS; ORGANIC MATERIALS; METALS; ALLOYS; CONTROL SYSTEMS; ELECTRONIC EQUIPMENT; ELECTRICAL EQUIPMENT; COMMUNICATION SYSTEMS; AUXILIARY POWER PLANTS; CLOSED-CYCLE ECOLOGICAL SYSTEMS.) (SHOCK; AERODYNAMIC HEATING; METEORITES.)
RADIO CORP. OF AMERICA, CAMDEN, N. J.
AD-274 641 62-3-2 DIV. 12

***SPECTROGRAPHIC ANALYSIS**

(ALLOYS; *METALS; IRON ALLOYS; TITANIUM ALLOYS; VANADIUM ALLOYS; ZIRCONIUM ALLOYS; SOLUTIONS; *SPECTROGRAPHIC ANALYSIS; TEST METHODS.)
WATERTOWN ARSENAL LABS., MASS.
AD-274 637 62-3-2 DIV. 4

(*SPECTROGRAPHIC ANALYSIS; SHOCK TUBES; *SHOCK WAVES; *GAS IONIZATION; GAS DISCHARGES; PLASMA JETS; *HYDROGEN; IMPURITIES.) (ELECTROMAGNETIC WAVES; *SPECTROGRAPHIC DATA; INTENSITY; WAVE ANALYSIS; MOLECULAR SPECTROSCOPY; GASES.) (LABORATORY EQUIPMENT; INSPECTION WINDOWS; QUARTZ.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 706 62-3-2 DIV. 25

***SPECTROGRAPHIC DATA**

(*SPECTROGRAPHIC ANALYSIS; SHOCK TUBES; *SHOCK WAVES; *GAS IONIZATION; GAS DISCHARGES; PLASMA JETS; *HYDROGEN; IMPURITIES.) (ELECTROMAGNETIC WAVES; *SPECTROGRAPHIC DATA; INTENSITY; WAVE ANALYSIS; MOLECULAR SPECTROSCOPY; GASES.) (LABORATORY EQUIPMENT; INSPECTION WINDOWS; QUARTZ.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 706 62-3-2 DIV. 25

***SPEECH TRANSMISSION**

(*VOICE COMMUNICATION SYSTEMS; *DIGITAL SYSTEMS; DATA STORAGE SYSTEMS; *SPEECH TRANSMISSION; CODING; INTELLIGIBILITY; AUDIOFREQUENCY; SIDEBANDS; DESIGN; TESTS.) (TRANSISTOR AMPLIFIERS; BAND-SELECTIVE AMPLIFIERS; BAND-PASS AMPLIFIERS; BAND-PASS FILTERS; ACOUSTIC FILTERS; TIMING CIRCUITS.) (PULSE GENERATORS; *PULSE MODULATION; PULSE TRANSMITTERS; CRYSTAL OSCILLATORS; *DATA PROCESSING SYSTEMS; *ANALOG-TO-DIGITAL CONVERTERS.)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
AD-274 466 62-3-2 DIV. 5

***SPHERES**

(*PLASMA PHYSICS; *SPHERES; DIELECTRIC PROPERTIES; ELECTROMAGNETIC WAVES; SCATTERING; ELECTROMAGNETIC WAVE REFLECTIONS; *RADAR ECHO AREAS; ELECTROMAGNETIC THEORY; MATHEMATICAL PREDICTION.)
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
AD-274 795 62-3-2 DIV. 6

***SPINELS**

(*BIBLIOGRAPHY; *CRYSTALS; GROWTH; PREPARATION; LASERS.) (*GARNET; *RUBY; *CORUNDUM; *SPINELS; SAPPHIRES; FERRITES; METALLIC COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; REFRACTORY MATERIALS.) (CRYSTAL STRUCTURE; SPECTROGRAPHIC ANALYSIS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 642 62-3-2 DIV. 14

***SPLIT FLAPS**

(*CANARD CONFIGURATION; AIRPLANES; *SPLIT FLAPS; *LEADING EDGE FLAPS; WIND TUNNEL MODELS; AERODYNAMICS; SUBSONIC FLOW; STABILITY (LATERAL); STABILITY (LONGITUDINAL); CONTROL; LIFT; EFFECTIVENESS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 580 62-3-2 DIV. 9

***STABILITY**

(*RODS; *ELASTICITY; *STABILITY; MECHANICAL PROPERTIES; STRESSES; DEFORMATION; THEORY; BEAMS; MATHEMATICAL ANALYSIS.) MECHANICS; APPLIED MECHANICS.
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 753 62-3-2 DIV. 25

***STABILIZERS (HORIZONTAL TAIL SURFACE)**

(*TAILS; *STABILIZERS (HORIZONTAL TAIL SURFACE); WIND TUNNEL MODELS; LOAD DISTRIBUTION; PRESSURE AT *FLUTTER; FREQUENCY DURING SUBSONIC FLOW; MATHEMATICAL ANALYSIS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 571 62-3-2 DIV. 9

***STAINLESS STEEL**

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

(*STAINLESS STEEL; *HEAT RESISTANT ALLOYS; *CORROSION RESISTANT ALLOYS; AUSTENITE; MARTENSITE; DISPERSION HARDENING; HEAT TREATMENT; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; DATA.) (DEFORMATION; PHASE TRANSITIONS; COOLING; AGING.)
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO
AD-274 805 62-3-2 DIV. 17

***STANDARDS**

(*COMMUNICATION SYSTEMS; TESTS; *STANDARDS; DESIGN; THEORY; TEST METHODS.) (*WAVE TRANSMISSION; RADIO WAVES; SCATTERING BY IONOSPHERE, ATMOSPHERE AND METEORS; VERY LOW FREQUENCY; IONOSPHERIC PROPAGATION; TRANSMISSION LINES; RADIOFREQUENCY CABLES; SATELLITE VEHICLES; RADIO TRANSMISSION; MICROWAVE RELAY SYSTEMS; RADIO RELAY SYSTEMS.) (*RADIO COMMUNICATION SYSTEMS; *MICROWAVE COMMUNICATION SYSTEMS; COMMUNICATION EQUIPMENT; COSTS; MATHEMATICAL ANALYSIS; SPECIFICATIONS.) RELIABILITY.
MINNEAPOLIS-HONEYWELL REGULATOR CO., SEATTLE, WASH.
AD-274 343 62-3-2 DIV. 5

***STATISTICAL PROCESSES**

(*STATISTICAL PROCESSES OF TIME; *SIGNALS IN A *COMMUNICATIONS SYSTEM.) (CORRELATION TECHNIQUES OF LINEAR SYSTEMS AND NON-LINEAR SYSTEMS; COMPUTERS, PROGRAMMING; ERRORS.) (WAVE TRANSMISSION; VECTOR ANALYSIS; INTEGRAL EQUATIONS; OPERATORS (MATHEMATICS); MATRIX ALGEBRA; INTEGRAL TRANSFORMS; SEQUENCES.) (DATA TRANSMISSION SYSTEMS; COMMUNICATIONS THEORY; RADIO SIGNALS; WAVE ANALYSIS.)
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
AD-274 492 62-3-2 DIV. 8

(*LINEAR PROGRAMMING; *STATISTICAL PROCESSES; SUPPLIES; COSTS; SCHEDULING.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 595 62-3-2 DIV. 15

***STATISTICAL TESTS**

(*ALGEBRAIC TOPOLOGY; *RELATIVITY THEORY; *GEODESICS; PARTICLE TRAJECTORIES; LIGHT TRANSMISSION.) (*STATISTICAL TESTS; PARTIAL DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS).
RAND CORP., SANTA MONICA, CALIF.
AD-274 598 62-3-2 DIV. 15

***STEEL**

(CHEMICAL ANALYSIS BY ION EXCHANGE AND PHOTOMETERS FOR DETERMINATION OF *URANIUM IN *STEEL.) TEST METHODS; NITRIC ACID; SEPARATION.)
WATERTOWN ARSENAL LABS., MASS.
AD-274 636 62-3-2 DIV. 4

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

(*ROCKET CASES; MANUFACTURING METHODS; DRAWING (MACHINE PROCESSING); HEAT TREATMENT; MACHINE TOOLS; METAL FORMING PRESSES; DIES.) (ALLOYS; METALS; *STEEL (300-M); *TITANIUM ALLOYS; NICKEL ALLOYS; COBALT ALLOYS; MOLYBDENUM ALLOYS.)
LYON, INC., DETROIT, MICH.
AD-274 828 62-3-2 DIV. 27

***STEEL TUBING**

(*HEAT TRANSFER; TESTS ON STAINLESS STEEL; *STEEL TUBING AT SUBSONIC FLOW OF AIR AT HIGH PRESSURE RESEARCH AND HIGH TEMPERATURE RESEARCH AT REYNOLDS NUMBER.)
POLYTECHNIC INST. OF BROOKLYN, N. Y.
AD-274 834 62-3-2 DIV. 25

***STEREOSCOPIC MAP PLOTTERS**

(TESTS OF OPTICAL INSTRUMENTS INCLUDING *STEREOSCOPIC MAP PLOTTERS FOR *MAPPING FROM AERIAL PHOTOGRAPHS.)
SYRACUSE U. RESEARCH INST., N. Y.
AD-274 613 62-3-2 DIV. 24

***STRATOSPHERE**

(*STRATOSPHERE; *WIND; TEMPERATURE; PERIODIC VARIATIONS; *METEOROLOGICAL CHARTS.)
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 487 62-3-2 DIV. 2

(NORTHERN HEMISPHERE; *STRATOSPHERE; *WIND; TEMPERATURE; BAROMETRIC PRESSURE; METEOROLOGICAL CHARTS.)
FREE U., BERLIN (GERMANY).
AD-274 488 62-3-2 DIV. 2

***STRESSES**

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-274 785 62-3-2 DIV. 17

(BUCKLING; DEFORMATION; *STRESSES; HYDROSTATIC PRESSURE; LOAD DISTRIBUTION; METAL PLATES; *CLAMPS; ENERGY.) (MATRIX ALGEBRA; INTEGRAL EQUATIONS; DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS).)
BROWN U., PROVIDENCE, R. I.
AD-274 796 62-3-2 DIV. 25

(FREE SURFACES OF *ELASTICITY; *SOLIDS AT SUPERSONICS; VELOCITY; VIBRATION; *STRESSES; *SHEAR STRESSES; LOADING; LOAD DISTRIBUTION.) (*PARTIAL DIFFERENTIAL EQUATIONS; TIME.)
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
AD-274 849 62-3-2 DIV. 25

***STRUCTURAL SHELLS**

(CYLINDRICAL BODIES; *STRUCTURAL SHELLS; VIBRATION.) (WAVE TRANSMISSION; *ELASTICITY.) DEFORMATION.
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 696 62-3-2 DIV. 25

***STRUCTURES**

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS.) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE.) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES.) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

(*METALS; *STRUCTURES; *FATIGUE (MECHANICS); STRESSES; DEFORMATION.) (ALUMINUM ALLOYS (7075-T61; STAINLESS STEEL (301; A-286); TITANIUM ALLOYS (8AL-1MO-1V).) (METAL JOINTS; RIVETED JOINTS.) PHOTOELASTICITY.
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
AD-274 656 62-3-2 DIV. 25

***SUBMARINES**

S (AUTOMATIC CONTROL; CONTROL SYSTEMS; *SUBMARINES; AUTOMATIC PILOTS; DEPTH INDICATORS.)
ELECTRIC BOAT DIV., GENERAL DYNAMICS CORP., GROTON, CONN.
AD-274 549 62-3-2 DIV. 31

***SUBSONIC FLOW**

(*VORTICES IN CONDENSATION TRAILS OF *HYPERVELOCITY PROJECTILES, *PELLETS IN XENON, BLUNT BODIES IN *SUBSONIC FLOW AND *HYPERSONIC FLOW AT LOW REYNOLDS NUMBER, SELF LUMINESCENCE, PHOTOGRAPHS OF TURBULENT FLOW, HYPERSONICS, WAKE.
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 535 62-3-2 DIV. 9

***SULFONYL RADICALS**

(*HEAT RESISTANT POLYMERS, SULFANURIC *SULFONYL RADICALS, *CHLORIDES, SYNTHESIS BY DECOMPOSITION, PYROLYSIS, CHLORINE COMPOUNDS, PHOSPHORUS COMPOUNDS, AZO RADICALS, SULFONYL RADICALS, CHLORIDES, ISOMER, HETEROCYCLIC COMPOUNDS.) (CHEMICAL REACTIONS, THIONYL CHLORIDES WITH AMMONIUM RADICALS, CHLORIDES, SULFAMYL RADICALS, AMINES.)
ILLINOIS U., URBANA.
AD-274 661 62-3-2 DIV. 4

***SUNSPOTS**

(MILITARY OPERATIONS, *RADIO COMMUNICATION SYSTEMS, HIGH FREQUENCY, PROPAGATION, *SUNSPOTS, *IONOSPHERIC DISTURBANCES, NOISE (RADIO), STATISTICAL ANALYSIS.)
JANSKY AND BAILEY DIV., ATLANTIC RESEARCH CORP., WHEATON, MD.
AD-274 735 62-3-2 DIV. 5

***SUPERCONDUCTIVITY**

(INFRARED DETECTORS, *MASERS.) (CRYOSTATS, *SUPERCONDUCTIVITY, SUPERCONDUCTORS, ELECTROMAGNETS.) *THIN FILMS,
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 703 62-3-2 DIV. 25

***SUPERSONIC FLOW**

(*SUPERSONIC FLOW, CROSS FLOW, LAMINAR BOUNDARY LAYER, TURBULENT FLOW, PRESSURE, MEASUREMENT, VORTICES.) (WIND TUNNELS, TESTS OF MODEL CONFIGURATION.)
CENTRE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, BRUSSLES (BELGIUM).
AD-274 761 62-3-2 DIV. 9

(*SUPERSONIC FLOW, *GASES, AIR AND FREON INJECTION INTO *LAMINAR BOUNDARY LAYER AND *TURBULENT BOUNDARY LAYER, PRESSURE, MEASUREMENT AT MACH NUMBER.) (WIND TUNNELS, TESTS OF MODEL CONFIGURATIONS.)
CENTRE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, BRUSSELS (BELGIUM).
AD-274 762 62-3-2 DIV. 9

***SURFACE TEMPERATURES**

(DESIGN OF *RADIOMETERS FOR SENSING ULTRAVIOLET RADIATION AND BLACKBODY RADIATION FOR MEASUREMENT OF *SURFACE TEMPERATURES OF SOLIDS, FEASIBILITY STUDIES, HIGH TEMPERATURE RESEARCH.) (TESTS, MOLYBDENUM, CONTROLLED ATMOSPHERES, OXIDATION, NUCLEAR ENERGY, RADIATION EFFECTS.)
BARNES ENGINEERING CO., STAMFORD, CONN.
AD-274 794 62-3-2 DIV. 25

***SWITCHING CIRCUITS**

(*RECTIFIERS, *INVERTED RECTIFIERS, SILICON, SEMICONDUCTORS, ELECTRIC TRIGGER CONTROLS, *INVERTER CIRCUITS, *SWITCHING CIRCUITS, TRIGGER CIRCUITS, TRIGGERED GATES, PULSE GENERATORS, RELAXATION OSCILLATORS, OSCILLATOR CIRCUITS, DESIGN, THEORY.) (TRANSFORMERS, INDUCTANCE, MAGNETIC CORES, MATHEMATICAL ANALYSIS.)
ORDNANCE RESEARCH LAB., PENNSYLVANIA STATE U., UNIVERSITY PARK.
AD-274 497 62-3-2 DIV. 7

(CODING AND *SWITCHING CIRCUITS FOR AUTOMATIC, *ERRORS, CORRECTIONS WITHIN *DIGITAL SYSTEMS.) (COMMUNICATION SYSTEMS, COMPUTER LOGIC.) (*DATA TRANSMISSION SYSTEMS, ELECTRICAL NETWORKS, DETECTION.) MATRIX ALGEBRA, *DIGITAL COMPUTERS.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 689 62-3-2 DIV. 30

***SYNTHESIS**

(*COMPUTERS, *SYNTHESIS AND *PROGRAMMING OF *FOURIER ANALYSIS, SERIES.) (THEORY AND STRUCTURES OF *DATA PROCESSING SYSTEMS, *DATA STORAGE SYSTEMS.) (ERRORS, NUMERICAL ANALYSIS, SEQUENCES.)
METCALF RESEARCH LAB., BROWN U., PROVIDENCE, R. I.
AD-274 719 62-3-2 DIV. 30

***SYNTHETIC RUBBER**

(*TAILS, *STABILIZERS (HORIZONTAL TAIL SURFACE), WIND TUNNEL MODELS, LOAD DISTRIBUTION, PRESSURE AT *FLUTTER, FREQUENCY DURING SUBSONIC FLOW, MATHEMATICAL ANALYSIS, MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 571 62-3-2 DIV. 9

***TANKS**

(*TANKS, *ARMORED VEHICLES, *TRACKED VEHICLES.) (*UNDERWATER NAVIGATION, SNORKEL, UNDERWATER COMMUNICATION SYSTEMS, FLOTATION.)
FOOD MACHINERY AND CHEMICAL CORP., SAN JOSE, CALIF.
AD-274 517 62-3-2 DIV. 22

***TANTALUM**

(ALLOYS, METALS, *CRYSTAL STRUCTURE, LATTICES, DEFORMATION, X-RAY DIFFRACTION ANALYSIS, *TANTALUM, *NIOBIUM, *MARTENSITE, STAINLESS STEEL (16 CR-12 NI).)
HAMMOND METALLURGICAL LAB., YALE U., NEW HAVEN, CONN.
AD-274 640 62-3-2 DIV. 17

***TANTALUM CAPACITORS**

(*ELECTROLYTIC CAPACITORS, *TANTALUM CAPACITORS, DESIGN, *MANUFACTURING METHODS, ANODES (ELECTROLYTIC CELL), SINTERING.) (SURFACE PROPERTIES, MANGANESE COMPOUNDS, OXIDES, DIOXIDES, CHEMICAL IMPURITIES, PROCESSING, TESTS.) (ANODES (ELECTROLYTIC CELL), TANTALUM, FOAMED METALS, ELECTRICAL PROPERTIES, CHEMICAL ANALYSIS.)
GENERAL ELECTRIC CO., IRMO, SOUTH CAROLINA.
AD-274 733 62-3-2 DIV. 8

***TARGETS**

(*SCATTERING, *ELECTROMAGNETIC WAVES, *TARGETS, *LOW FREQUENCY.) (QUANTUM MECHANICS, PARTIAL DIFFERENTIAL EQUATIONS, POLYNOMIALS, METAMATHEMATICS, NONLINEAR SYSTEMS.)
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 528 62-3-2 DIV. 25

***TELEMETERING ANTENNAS**

(*TRANSMISSION LINES FOR *TELEMETERING ANTENNAS, LOBING, TRACKING, VERY HIGH FREQUENCY.) (ANTENNA HARDWARE, ANTENNA RADIATION PATTERNS, POLARIZATION, STANDING WAVE RATIOS, IMPEDANCE, MEASUREMENT.)
ALPHA CORP., RICHARDSON, TEX.
AD-274 512 62-3-2 DIV. 8

***TELEMETERING TRANSMITTERS**

(*TELEMETERING TRANSMITTERS WITH RADIOFREQUENCY FILTERS, FREQUENCY MODULATION, RADIOFREQUENCY POWER, *RADIO INTERFERENCE, *RADIOFREQUENCY SPECTRUM ANALYZERS, RELIABILITY, TESTING, (TELEMETERING ANTENNAS, TRANSMISSION LINES, INTERFERENCE.) (TELEMETER SYSTEMS, COMMUNICATION EQUIPMENT, AIRCRAFT EQUIPMENT, GUIDED MISSILES, TEST FACILITIES, INSTRUMENTATION.)
ARMY SIGNAL MISSILE SUPPORT AGENCY, WHITE SANDS MISSILE RANGE, N. MEX.
AD-274 540 62-3-2 DIV. 6

***TELLURIDES**

(*INTERMETALLIC COMPOUNDS, SEMICONDUCTORS, CRYSTALS, SINGLE CRYSTALS, *THERMOELECTRICITY, *LEAD COMPOUNDS, BARIUM COMPOUNDS, TIN COMPOUNDS, *TELLURIDES, *SELENIDES, ELECTRICAL PROPERTIES, RESISTANCE, HALL EFFECT, PHASE STUDIES.) SOLID STATE PHYSICS, ELECTRONICS, ALLOYS.
NEW YORK U., N. Y.
AD-274 498 62-3-2 DIV. 25

(SEMICONDUCTORS, INTERMETALLIC COMPOUNDS, *BISMUTH COMPOUNDS, *TELLURIDES, SELENIDES, *THERMAL CONDUCTIVITY, LATTICES, THERMOELECTRICITY, CHEMICAL IMPURITIES, TEMPERATURE.) BISMUTH ALLOYS, TELLURIUM ALLOYS, SELENIUM ALLOYS.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
AD-274 717 62-3-2 DIV. 25

***TELLURIUM ALLOYS**

(*SEMICONDUCTORS, *INTERMETALLIC COMPOUNDS, CRYSTALS, *SINGLE CRYSTALS, ALLOYS, *LEAD ALLOYS, *TELLURIUM ALLOYS, TELLURIDES.) (*PHASE STUDIES, TEMPERATURE, VAPOR PRESSURE, THERMODYNAMICS, THEORY.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 496 62-3-2 DIV. 17

***TELLURIUM COMPOUNDS**

(*TRANSPORT PROPERTIES IN *SEMICONDUCTORS OF LEAD, *TELLURIUM COMPOUNDS.) (MAGNETIC FIELDS, *THERMAL CONDUCTIVITY, TEMPERATURE, MEASUREMENT, THERMOELECTRICITY.) (SCATTERING, RELAXATION TIME, LATTICES.)
ENERGY CONVERSION AND SEMICONDUCTOR LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 541 62-3-2 DIV. 25

***TEMPERATURE**

(*EXPLOSIVES, *TEMPERATURE, SAFETY, HAZARDS, *EXPLOSIVE TRAINS.) (EXPLOSIVES, HEATING, REMOTE CONTROL SYSTEMS, TESTS, TEST EQUIPMENT, TEST METHODS.) (EXPLOSIVES, STABILITY, SENSITIVITY, *TEMPERATURE CONTROL, THERMAL EXPANSION.)
AEROJET-GENERAL CORP., DOWNEY, CALIF.
AD-274 511 62-3-2 DIV. 22

***TEMPERATURE CONTROL**

(*EXPLOSIVES, *TEMPERATURE, SAFETY, HAZARDS, *EXPLOSIVE TRAINS.) (EXPLOSIVES, HEATING, REMOTE CONTROL SYSTEMS, TESTS, TEST EQUIPMENT, TEST METHODS.) (EXPLOSIVES, STABILITY, SENSITIVITY, *TEMPERATURE CONTROL, THERMAL EXPANSION.)
AEROJET-GENERAL CORP., DOWNEY, CALIF.
AD-274 511 62-3-2 DIV. 22

***TERRESTRIAL MAGNETISM**

(*TERRESTRIAL MAGNETISM, PROPAGATION, IONOSPHERE, TABLES.) (MAGNETOHYDRODYNAMICS, RADIO WAVES.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 485 62-3-2 DIV. 2

(*TERRESTRIAL MAGNETISM, PROPAGATION, IONOSPHERE.) MAGNETOMETERS.
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 486 62-3-2 DIV. 2

(*TERRESTRIAL MAGNETISM, MAGNETIC FIELDS, SOLAR ENERGY, PROTONS, *VAN ALLEN RADIATION BELT.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 698 62-3-2 DIV. 2

(*AURORAE, RADIO WAVES, VERY HIGH FREQUENCY, REFLECTION, DIURNAL VARIATIONS, PERIODIC VARIATIONS, *TERRESTRIAL MAGNETISM.)
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN).
AD-274 736 62-3-2 DIV. 2

***TEST FACILITIES**

(*KLYSTRONS, TEST EQUIPMENT, *TEST FACILITIES, CONSTRUCTION.) (MODULATORS, *MODULATOR TUBES, PULSE GENERATORS, PULSE TRANSFORMERS, RESISTORS, TRANSMISSION LINES, POWER SUPPLIES, ELECTRONIC SWITCHES, ELECTRONIC CIRCUITS, SWITCHING CIRCUITS, DESIGN, PRODUCTION, TESTS.) (*TRIODES, MODULATOR TUBES.)
RADIATION, INC., PALO ALTO, CALIF.
AD-274 604 62-3-2 DIV. 30

***THERMAL CONDUCTIVITY**

(*TRANSPORT PROPERTIES IN *SEMICONDUCTORS OF LEAD, *TELLURIUM COMPOUNDS.) (MAGNETIC FIELDS, *THERMAL CONDUCTIVITY, TEMPERATURE, MEASUREMENT, THERMOELECTRICITY.) (SCATTERING, RELAXATION TIME, LATTICES.)
ENERGY CONVERSION AND SEMICONDUCTOR LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 541 62-3-2 DIV. 25

(SEMICONDUCTORS, INTERMETALLIC COMPOUNDS, *BISMUTH COMPOUNDS, *TELLURIDES, SELENIDES, *THERMAL CONDUCTIVITY, LATTICES, THERMOELECTRICITY, CHEMICAL IMPURITIES, TEMPERATURE.) BISMUTH ALLOYS, TELLURIUM ALLOYS, SELENIUM ALLOYS.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
AD-274 717 62-3-2 DIV. 25

***THERMAL INSULATION**

(*ROCKET MOTORS, SOLID ROCKET PROPELLANTS, *THERMAL INSULATION, MATERIALS, BINDERS, *HEAT RESISTANT POLYMERS, *COMPOSITE MATERIALS, SILICONE RESINS, *EPOXY RESINS, *PHENOLIC RESINS, ASBESTOS FIBERS, REINFORCING MATERIALS, MECHANICAL PROPERTIES, TESTS, AGING.) (PHTHALIC ANHYDRIDES, ANHYDRIDES, FURAN, CYANAMIDES, CYANURIC ACID, ESTERS, HETEROCYLIC COMPOUNDS, RESINS, CASTOR OIL.)
ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
AD-274 533 62-3-2 DIV. 14

(LOW PRESSURE RESEARCH, HIGH TEMPERATURE RESEARCH, *THERMAL INSULATION, *VACUUM SYSTEMS, MATERIALS, GRAPHITE, FIBERS, POWDERS (ADL-17), THORIUM COMPOUNDS, DIOXIDES, METAL PLATES, TANTALUM FOR SHIELDING OF THERMAL RADIATION.) (HEAT TRANSFER, THERMAL CONDUCTIVITY, PHYSICAL PROPERTIES, CHEMICAL PROPERTIES, TESTS.) (POWER REACTORS, NUCLEAR POWER PLANTS, ROCKET MOTORS, HYPERVELOCITY VEHICLES, SPACESHIPS, SATELLITE VEHICLES.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 742 62-3-2 DIV. 14

***THERMIONIC EMISSION**

(*ELECTRIC POWER PRODUCTION, GENERATORS, *ELECTRIC PROPULSION, *THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM ELECTRON TUBES, CATHODES (ELECTRON TUBES), DESIGN, SEALS, MATERIALS, CERAMIC MATERIALS, LABORATORY EQUIPMENT, SPECTROGRAPHIC ANALYSIS, ELECTRIC INSULATION, HIGH TEMPERATURE RESEARCH, LOW PRESSURE RESEARCH.) (CESIUM, GAS IONIZATION, VAPORS, THERMODYNAMICS, TRANSPORT PROPERTIES.)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 694 62-3-2 DIV. 25

***THERMODYNAMICS**

(*THERMODYNAMICS; *IRREVERSIBLE PROCESSES; *FLUID MECHANICS; GASES; DIFFUSION; PRESSURE; PHYSICAL CHEMISTRY.) (*KINETIC THEORY; ENTROPY; GAS FLOW.) (*MATHEMATICAL ANALYSIS; PARTIAL DIFFERENTIAL EQUATIONS.)
FRANKFORD ARSENAL; PHILADELPHIA; PA.
AD-274 781 62-3-2 DIV. 9

***THERMOELECTRICITY**

(*INTERMETALLIC COMPOUNDS; SEMICONDUCTORS; CRYSTALS; SINGLE CRYSTALS; *THERMOELECTRICITY; *LEAD COMPOUNDS; BARIUM COMPOUNDS; TIN COMPOUNDS; *TELLURIDES; *SELENIDES; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; PHASE STUDIES.) SOLID STATE PHYSICS; ELECTRONICS; ALLOYS.
NEW YORK U.; N. Y.
AD-274 498 62-3-2 DIV. 25

(*THERMOELECTRICITY; MATERIALS; SODIUM COMPOUNDS; VANADIUM COMPOUNDS; OXIDES; ELECTRIC POTENTIAL; MEASUREMENT; CONTROLLED ATMOSPHERES; OXYGEN; AIR; HELIUM; HYDROGEN; ELECTRON TRANSITIONS; FLUIDS.)
OHIO STATE U. RESEARCH FOUNDATION; COLUMBUS.
AD-274 831 62-3-2 DIV. 25

***THERMONUCLEAR REACTIONS**

(*MAGNETOHYDRODYNAMICS; DETONATION WAVES; ELECTRICITY; CONDUCTIVITY; GASES.) (MAGNETIC FIELDS; *PLASMA PHYSICS.) (HIGH TEMPERATURE RESEARCH; *THERMONUCLEAR REACTIONS; REACTION TIME; SHOCK.)
AEROSPACE CORP.; LOS ANGELES; CALIF.
AD-274 697 62-3-2 DIV. 25

***THIN FILMS**

(*THIN FILMS; CRYSTALS; FERROMAGNETIC MATERIALS; DAMPING; *FERROMAGNETISM; THEORY; MATHEMATICAL ANALYSIS.) (*SCIENTIFIC RESEARCH; *HIGH TEMPERATURE RESEARCH; METALORGANIC COMPOUNDS; POLYMERIZATION; POLYMERS; PHOSPHONITRILE CHLORIDES; LITHIUM; AZIDES; BENZENES; NITROBENZENES; PHOSPHORUS COMPOUNDS; AMMONIA.) (INFRARED SPECTROSCOPY; INTERFEROMETERS; SPECTROGRAPHIC ANALYSIS; GERMANIUM; ELECTROCHEMISTRY; STORAGE BATTERIES; ELECTROLYTES; ELECTRODES; CATHODES (ELECTROLYTIC CELL); ANODES (ELECTROLYTIC CELL); PLATINUM; STEEL; SILVER; COPPER; NICKEL.) (*SEMICONDUCTORS; DIFFERENTIAL EQUATIONS; MATRIX ALGEBRA.) (ANTENNAS; *GUIDED MISSILE ANTENNAS; SUPERHIGH FREQUENCY; *SLOT ANTENNAS; COUPLED ANTENNAS; MEASUREMENT OF ANTENNA RADIATION PATTERNS.) (NONLINEAR SYSTEMS; TRANSMISSION LINES; WAVE TRANSMISSION; ELECTROMAGNETIC WAVES; PROPAGATION; PLASMA PHYSICS; *RARE GASES; PARTIAL DIFFERENTIAL EQUATIONS; VECTOR ANALYSIS; ELECTRIC FIELDS; CONDUCTIVITY; MAGNETIC FIELDS; ELECTRONS.)
NAVAL ORDNANCE LAB.; CORONA; CALIF.
AD-274 504 62-3-2 DIV. 25

(INFRARED DETECTORS; *MASERS.) (CRYOSTATS; *SUPERCONDUCTIVITY; SUPERCONDUCTORS; ELECTROMAGNETS.) *THIN FILMS.
AEROSPACE CORP.; EL SEGUNDO; CALIF.
AD-274 703 62-3-2 DIV. 25

***THORIUM COMPOUNDS**

(*REFRACTORY MATERIALS; PLASTICS; CARBONIZATION; VAPORIZATION; PHASE STUDIES; MOLECULAR SPECTROSCOPY; INFRARED SPECTROSCOPY; ULTRAVIOLET SPECTROSCOPY; RESONANCE ABSORPTION; VAPOR PRESSURE; HIGH TEMPERATURE RESEARCH; *BLACKBODY RADIATION.) (*NITRIDES; ZIRCONIUM COMPOUNDS; TANTALUM COMPOUNDS; HAFNIUM COMPOUNDS.) (*THORIUM COMPOUNDS; OXIDES.) (*BORIDES; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; SPECTROGRAPHIC ANALYSIS.)
GENERAL ELECTRIC CO.; CINCINNATI; OHIO.
AD-274 684 62-3-2 DIV. 14

***THRUST**

(*THRUST; CONTROL SYSTEMS; GUIDANCE; *ORBITAL FLIGHT PATHS; GUIDED MISSILE TRAJECTORIES; ANALYSIS OF VARIANCE.) (COMPLEX VARIABLES; ERRORS; *CORRECTIONS.)
POLYTECHNIC INST. OF BROOKLYN; N. Y.
AD-274 749 62-3-2 DIV. 25

***TITANIUM ALLOYS**

(JET TRAINING PLANES; JET ENGINES; MOUNTING BRACKETS; FORGING; *TITANIUM ALLOYS (6AL-4V); ALUMINUM ALLOYS; VANADIUM ALLOYS; QUALITY CONTROL; MECHANICAL PROPERTIES; TENSILE PROPERTIES; DEFORMATION; STRESSES; STATISTICAL ANALYSIS.)
NORTHROP CORP.; HAWTHORNE; CALIF.
AD-274 589 62-3-2 DIV. 17

(ALLOYS; *HEAT RESISTANT ALLOYS; *STEEL; *STAINLESS STEEL; *TITANIUM ALLOYS (120 VCA); VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; *STRESSES; *CORROSION; FRACTURE (MECHANICS); FAILURE (MECHANICS).) ROCKET CASES; MATERIALS; CORROSION INHIBITION; PLASTIC COATINGS; *CORROSION RESEARCH; CORROSIVE GASES; CORROSIVE LIQUIDS.
AEROJET-GENERAL CORP.; AZUSA; CALIF.
AD-274 785 62-3-2 DIV. 17

(*ROCKET CASES; MANUFACTURING METHODS; DRAWING (MACHINE PROCESSING); HEAT TREATMENT; MACHINE TOOLS; METAL FORMING PRESSES; DIES.) (ALLOYS; METALS; *STEEL (300-M); *TITANIUM ALLOYS; NICKEL ALLOYS; COBALT ALLOYS; MOLYBDENUM ALLOYS.)
LYON; INC.; DETROIT; MICH.
AD-274 828 62-3-2 DIV. 27

***TRACKED VEHICLES**

(*TANKS; *ARMORED VEHICLES; *TRACKED VEHICLES.) (*UNDERWATER NAVIGATION; SNORKEL; UNDERWATER COMMUNICATION SYSTEMS; FLOTATION.)
FOOD MACHINERY AND CHEMICAL CORP.; SAN JOSE; CALIF.
AD-274 817 62-3-2 DIV. 22

***TRANSDUCERS**

(*RE-ENTRY VEHICLES; INSTRUMENTATION.) (*TRANSDUCERS; *PRESSURE; ATMOSPHERE; AIR.) (GASES; COMPRESSIBLE FLOW; SUPERAERODYNAMICS.) (PRESSURE GAGES; GASES.) TIME.
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER; LOS ANGELES.
AD-274 626 62-3-2 DIV. 30

(*TRANSDUCERS; MEASUREMENT; ELECTRICAL CONDUCTANCE; *PLASMA JETS; *INSTRUMENTATION.) (GAS FLOW; VELOCITY; TESTS; ARGON.) (CONDUCTORS; CALIBRATION; ALUMINUM; STAINLESS STEEL; GRAPHITE.)
AEROSPACE CORP.; LOS ANGELES; CALIF.
AD-274 695 62-3-2 DIV. 25

(*CIRCUITS; DESIGN; *TRANSDUCERS; *PROTON ACCELERATORS.) (CESIUM COMPOUNDS; IODIDES; CRYSTALS.) (INSTRUMENTATION; ELECTRON MULTIPLIERS; PHOTOTUBES.) (*SATELLITE VEHICLE RESEARCH; FLIGHT PATHS; FLIGHT TESTING.)
AEROSPACE CORP.; LOS ANGELES; CALIF.
AD-274 702 62-3-2 DIV. 30

***TRANSFORMATIONS**

(*MATERIALS FOR SPACESHIPS; AIRCRAFT; *MANUFACTURING METHODS; PROCESSING; *TRANSFORMATIONS; PHASE TRANSITIONS; FEASIBILITY STUDIES.) (ABRASION; BONDING (SOLID STATE); CHEMICAL MILLING; DRAWING (MACHINE PROCESSING); SINTERING; ULTRASONICS; MELTING; WELDING; RADIATION EFFECTS; MACHINING.) (SOLIDS; REFRACTORY MATERIALS; CERAMIC MATERIALS; CRYSTALS.) (TEMPERATURE; PRESSURE; ELECTRIC FIELDS; MAGNETIC FIELDS.)
CORNELL AERONAUTICAL LAB., INC.; BUFFALO; N. Y.
AD-274 651 62-3-2 DIV. 26

***TRANSFORMATIONS (MATHEMATICS)**

(*PLASMA PHYSICS; *ELECTRON BEAMS; *PARTICLES; ELECTRONS; IONS IN MAGNETIC FIELDS; TRANSPORT PROPERTIES.) (TEMPERATURE; PRESSURE; ENERGY.) (TRANSFORMATIONS (MATHEMATICS); HYDRODYNAMICS; EQUATIONS; PARTIAL DIFFERENTIAL EQUATIONS.)
AEROSPACE CORP.; EL SEGUNDO; CALIF.
AD-274 645 62-3-2 DIV. 25

***TRANSISTORS**

(*TRANSISTORS; SILICON; HIGH FREQUENCY; *SEMICONDUCTORS; *MANUFACTURING METHODS; PRODUCTION; PROCESSING.) (CRYSTALS; SILICON; CHEMICAL IMPURITIES; DIFFUSION; ETHYL RADICALS; SILICATES; PROPYL RADICALS; BORATES; PHOSPHORUS COMPOUNDS; OXYCHLORIDES; INDUCTANCE.) *PACKAGED CIRCUITS; DESIGN; THEORY.
PACIFIC SEMICONDUCTORS; INC.; LAWNDALE; CALIF.
AD-274 833 62-3-2 DIV. 8

(AUDIOFREQUENCY; *TRANSISTORS FOR TRANSISTOR AMPLIFIERS; *AUDIO AMPLIFIERS, AMPLIFIERS; DESIGN; *MANUFACTURING METHODS; AUTOMATIC PRODUCTION; GERMANIUM; PROCESSING, MATERIALS; ALLOYS; ELECTRICAL PROPERTIES; SURFACES; ENCAPSULATION; TEST EQUIPMENT; RELIABILITY; MECHANICAL PROPERTIES.)
WESTERN ELECTRIC CO.; LAURELDALE; PA.
AD-274 847 62-3-2 DIV. 8

***TRANSMISSION LINES**

(*TRANSMISSION LINES FOR *TELEMETERING ANTENNAS; LOBING; TRACKING; VERY HIGH FREQUENCY.) (ANTENNA HARDWARE; ANTENNA RADIATION PATTERNS; POLARIZATION; STANDING WAVE RATIOS; IMPEDANCE; MEASUREMENT.)
ALPHA CORP.; RICHARDSON; TEX.
AD-274 512 62-3-2 DIV. 8

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN.) (*WAVEGUIDES; MICROWAVE FREQUENCY; RADAR DUPLEXERS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *MICROWAVE EQUIPMENT; GASES; PRESSURE; TEMPERATURE; COOLING BY CONVECTION; WAVEGUIDE FILTERS; SURFACE PROPERTIES; ANALYSIS.) (PROPAGATION; WAVE TRANSMISSION; ATTENUATION; ABSORPTION.)
MICROWAVE RESEARCH ASSOCIATES; INC.; BURLINGTON; MASS.
AD-274 819 62-3-2 DIV. 8

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN.) (*WAVEGUIDES; MICROWAVE FREQUENCY; CAVITY RESONATORS; *MICROWAVE EQUIPMENT; WAVEGUIDE COUPLERS; WAVEGUIDE IRISES; TEMPERATURE; PRESSURE; COOLING; FINS; CONVECTION; LIQUID COOLED; WAVEGUIDE FILTERS; HEAT TRANSFER; COOLANT; COOLANT PUMPS; HEAT EXCHANGERS.)
MICROWAVE ASSOCIATES; INC.; BURLINGTON; MASS.
AD-274 820 62-3-2 DIV. 8

***TRANSPORT PROPERTIES**

(*TRANSPORT PROPERTIES IN *SEMICONDUCTORS OF LEAD; *TELLURIUM COMPOUNDS.) (MAGNETIC FIELDS; *THERMAL CONDUCTIVITY; TEMPERATURE; MEASUREMENT; THERMOELECTRICITY.) (SCATTERING; RELAXATION TIME; LATTICES.)
ENERGY CONVERSION AND SEMICONDUCTOR LAB.; MASS. INST. OF TECH.; CAMBRIDGE.
AD-274 541 62-3-2 DIV. 25

(*PLASMA PHYSICS; PARTICLES; *ELECTROMAGNETIC EFFECTS; DIFFUSION; *TRANSPORT PROPERTIES.) (PHYSICAL PROPERTIES; DENSITY; ENERGY; TEMPERATURE.)
UNIVERSITY OF SOUTHERN CALIF. ENGINEERING CENTER; LOS ANGELES.
AD-274 627 62-3-2 DIV. 25

***TRAVELING WAVE TUBES**

(*MICROWAVE AMPLIFIERS; *TRAVELING WAVE TUBES; EXTREMELY HIGH FREQUENCY; SIGNAL-TO-NOISE RATIO; NOISE (RADIO); REDUCTION; *BAND-PASS FILTERS; TUNING DEVICES; YTTRIUM; GARNET.) (CATHODES (ELECTRON TUBES); MINIATURE ELECTRONIC EQUIPMENT; MANUFACTURING METHODS; TANTALUM.) (CATHODES (ELECTRON TUBES); HEATING; ANODES; HELIXES; STANDING WAVE RATIOS; FREQUENCY SHIFT; SENSITIVITY; MAGNETS; FOCUSING; TESTS.)
WATKINS-JOHNSON CO.; PALO ALTO; CALIF.
AD-274 639 62-3-2 DIV. 8

***TRIANGULAR WINGS**

(*TRIANGULAR WINGS; SWEPT-BACK WINGS; BLUNT BODIES; WIND TUNNEL MODELS; PRESSURE; LOAD DISTRIBUTION; SUPERSONICS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 581 62-3-2 DIV. 9

***TRIODES**

(*KLYSTRONS; TEST EQUIPMENT; *TEST FACILITIES; CONSTRUCTION.) (MODULATORS; *MODULATOR TUBES; PULSE GENERATORS; PULSE TRANSFORMERS; RESISTORS; TRANSMISSION LINES; POWER SUPPLIES; ELECTRONIC SWITCHES; ELECTRONIC CIRCUITS; SWITCHING CIRCUITS; DESIGN; PRODUCTION; TESTS.) (*TRIODES; MODULATOR TUBES.)
RADIATION, INC.; PALO ALTO; CALIF.
AD-274 604 62-3-2 DIV. 30

***TUNED AMPLIFIERS**

(*PARAMETRIC AMPLIFIERS; SOLID STATE PHYSICS; C BAND; BROADBAND; DESIGN; TESTS.) (*MICROWAVE AMPLIFIERS; *ELECTRONIC CIRCUITS; TUNED CIRCUITS; TUNING CIRCUITS; DIODES; SILICON; PACKAGING; RESONANCE; THEORY; MATHEMATICAL ANALYSIS.) (*TUNED AMPLIFIERS; BACKWARD-WAVE OSCILLATORS.)
MICROMEGA CORP.; VENICE; CALIF.
AD-274 619 62-3-2 DIV. 8

***TUNGSTEN**

(REFRACTORY MATERIALS; *TUNGSTEN; *BRAZING; SILVER SOLDERS.) (SOLDERING ALLOYS; PLATINUM ALLOYS; BORON ALLOYS; POWDER ALLOYS; ADDITIVES; POWDER METALS; FOILS; TITANIUM; ZIRCONIUM; HALIDES; METAL JOINTS; WELDED JOINTS; DIFFUSION; THICKNESS.) (CHEMICAL REACTIONS; TUNGSTEN COMPOUNDS; BORIDES.)
SOLAR AIRCRAFT CO.; SAN DIEGO; CALIF.
AD-274 616 62-3-2 DIV. 17

(*TUNGSTEN; *TUNGSTEN ALLOYS (W-3MO); MOLYBDENUM ALLOYS; *EXTRUSION; PRODUCTION; PROCESSING; SURFACE PROPERTIES.) (MICROSTRUCTURE; DIES; MATERIALS; LUBRICANTS; GLASS; GLASS TEXTILES.) (CASTINGS; CHEMICAL ANALYSIS; NON-DESTRUCTIVE TESTING; ULTRASONICS; HEATING; HEAT TREATMENT; TEMPERATURE.)
WAH CHANG CORP.; ALBANY; OREG.
AD-274 767 62-3-2 DIV. 17

***TUNGSTEN ALLOYS**

(HIGH TEMPERATURE RESEARCH (2900 TO 4400 F); TUNGSTEN; *TUNGSTEN ALLOYS; *MOLYBDENUM ALLOYS (10; 25; 50 WT-%); TENSILE PROPERTIES; STRESSES; RUPTURE.) ROCKET MOTORS; MATERIALS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 567 62-3-2 DIV. 17

(*TUNGSTEN; *TUNGSTEN ALLOYS (W-3MO); MOLYBDENUM ALLOYS; *EXTRUSION; PRODUCTION; PROCESSING; SURFACE PROPERTIES;) (MICROSTRUCTURE; DIES; MATERIALS; LUBRICANTS; GLASS; GLASS TEXTILES;) (CASTINGS; CHEMICAL ANALYSIS; NON-DESTRUCTIVE TESTING; ULTRASONICS; HEATING; HEAT TREATMENT; TEMPERATURE;)
WAH CHANG CORP., ALBANY, OREG.
AD-274 767 62-3-2 DIV. 17

*TURBULENCE

(*ATMOSPHERE; TEMPERATURE; *WATER VAPOR; *TURBULENCE; BOUNDARY LAYER; WIND; MEASUREMENT; STATISTICAL ANALYSIS;) HYGROMETERS; ROUND HILL FIELD STATION; MASS. INST. OF TECH.; SOUTH DARTMOUTH.
AD-274 494 62-3-2 DIV. 2

*TURBULENT BOUNDARY LAYER

(*SUPERSONIC FLOW; *GASES; AIR AND FREON INJECTION INTO *LAMINAR BOUNDARY LAYER AND *TURBULENT BOUNDARY LAYER; PRESSURE MEASUREMENT AT MACH NUMBER;) (*WIND TUNNELS; TESTS OF MODEL CONFIGURATIONS;)
CENTRE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, BRUSSELS (BELGIUM).
AD-274 762 62-3-2 DIV. 9

*ULTRASONIC RADIATION

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES;) (RADIO EQUIPMENT; EXTREMELY HIGH FREQUENCY;) (SOUND GENERATORS; ULTRASONIC RADIATION;)
EMERTRON, INC., SILVER SPRING, MD.
AD-274 809 62-3-2 DIV. 8

(*RADIO WAVES; *EXTREMELY HIGH FREQUENCY; *SCATTERING; *ULTRASONIC RADIATION; AIR; HEAT; PRECIPITATION; PROJECTILES;) (ULTRASONIC RADIATION; PROPAGATION; AIR; REFRACTIVE INDEX;) (SOUND GENERATORS; ULTRASONIC RADIATION;) (RADIO EQUIPMENT, EXTREMELY HIGH FREQUENCY;)
EMERTRON, INC., SILVER SPRING, MD.
AD-274 810 62-3-2 DIV. 8

*UNDERGROUND STRUCTURES

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS;) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE;) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES;) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

(*UNDERGROUND STRUCTURES; *SHELTERS; SAFETY; STABILITY AND *GEOLOGY;) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; FAILURE (MECHANICS) OF *ROCKS; SOILS;) (*GEOLOGICAL SURVEY FOR UNDERGROUND STRUCTURES; STRESSES; *MINING ENGINEERING; DESIGN; MATHEMATICAL ANALYSIS; CONSTRUCTION; ENGINEERING; STRUCTURES;) (*GEOPHYSICAL PROSPECTING; THEORY; TEST METHODS;) (*SHOCK WAVES; *SEISMIC WAVES; PROPAGATION; ATTENUATION; MEASUREMENT; INSTRUMENTATION;) NUCLEAR EXPLOSIONS.
MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
AD-274 825 62-3-2 DIV. 13

*UNDERWATER NAVIGATION

(*TANKS; *ARMORED VEHICLES, *TRACKED VEHICLES;) (*UNDERWATER NAVIGATION; SNORKEL; UNDERWATER COMMUNICATION SYSTEMS; FLOTATION;)
FOOD MACHINERY AND CHEMICAL CORP., SAN JOSE, CALIF.
AD-274 517 62-3-2 DIV. 22

*UNDERWATER PROPULSION

(HYDRODYNAMICS; *DRAG; FRICTION; *REDUCTION; DAMPING; COATINGS; ELASTIC SHELLS; *UNDERWATER PROPULSION; TEST METHODS;) (*BOUNDARY LAYER; FLUID FLOW;)
UNITED STATES RUBBER CO., WAYNE, N. J.
AD-274 628 62-3-2 DIV. 25

*UNDERWATER SOUND SIGNAL

(MATHEMATICAL PREDICTION FOR *DETECTION OF *SONAR SIGNALS; SIGNAL-TO-NOISE RATIO; UNDERWATER SOUND SIGNAL;) (*SONAR; SONAR EQUIPMENT; SONAR RECEIVERS; DESIGN;) (UNDERWATER SOUND; UNDERWATER SOUND TRANSMISSION; *UNDERWATER SOUND SIGNAL; DETECTION;)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 500 62-3-2 DIV. 6

*URANIUM

(*URANIUM; URANIUM ALLOYS (92 WT.-%); STRUCTURES; QUALITY CONTROL; *RADIOGRAPHY; *INDUSTRIAL RADIOGRAPHY; NONDESTRUCTIVE TESTING; X-RAY PHOTOGRAPHY;) X RAYS; ABSORPTION; SCATTERING; SHIELDING; TEST METHODS;)
WATERTOWN ARSENAL LABS., MASS.
AD-274 633 62-3-2 DIV. 17

(CHEMICAL ANALYSIS BY ION EXCHANGE AND PHOTOMETERS FOR DETERMINATION OF *URANIUM IN *STEEL;) TEST METHODS; NITRIC ACID; SEPARATION;)
WATERTOWN ARSENAL LABS., MASS.
AD-274 636 62-3-2 DIV. 6

*VACUUM SYSTEMS

(GASES; CONDENSATION; *CRYOGENICS; GAS PUMPS; *VACUUM SYSTEMS;) (LIQUEFIED GASES; NITROGEN;) IONIZATION GAGES.
CRYOVAC, INC., COLUMBUS, OHIO.
AD-274 650 62-3-2 DIV. 9

(LOW PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; *THERMAL INSULATION; *VACUUM SYSTEMS; MATERIALS; GRAPHITE; FIBERS; POWDERS (ADL-17); THORIUM COMPOUNDS, DIOXIDES; METAL PLATES; TANTALUM FOR SHIELDING OF THERMAL RADIATION;) (HEAT TRANSFER; THERMAL CONDUCTIVITY; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; TESTS;) (POWER REACTORS; NUCLEAR POWER PLANTS; ROCKET MOTORS; HYPERVELOCITY VEHICLES; SPACESHIPS; SATELLITE VEHICLES;)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 742 62-3-2 DIV. 14

*VALVES

(*BLAST ON *STRUCTURES; *UNDERGROUND STRUCTURES; *SHELTERS; *PRESSURE; LOAD DISTRIBUTION; ANALYSIS;) (*NUCLEAR WEAPONS; NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS; RADIATION EFFECTS; THERMAL RADIATION; ORIFICES; PROPAGATION; WAVE TRANSMISSION; *SHOCK WAVES; ATTENUATION; PRESSURE;) (*VALVES; *PNEUMATIC VALVES; *HIGH PRESSURE VALVES; *SAFETY VALVES; HYDRAULIC VALVES;) GUIDED MISSILES.
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 646 62-3-2 DIV. 13

*VAN ALLEN RADIATION BELT

(*VAN ALLEN RADIATION BELT; *SATELLITE VEHICLES; *ELECTROSTATIC FIELDS; ELECTRIC POTENTIAL; PROTONS; ELECTRONS;)
RAND CORP., SANTA MONICA, CALIF.
AD-274 599 62-3-2 DIV. 2

(*TERRESTRIAL MAGNETISM; MAGNETIC FIELDS; SOLAR ENERGY; PROTONS; *VAN ALLEN RADIATION BELT;)
AEROSPACE CORP., LOS ANGELES, CALIF.
AD-274 698 62-3-2 DIV. 2

*VIBRATION

(MECHANICAL ENGINEERING; *ROTATING STRUCTURES; RODS; *VIBRATION; *ELASTICITY; NONLINEAR SYSTEMS;) (ENERGY; DAMPING; RODS;)
USSR.
MINNESOTA U., MINNEAPOLIS.
AD-274 743 62-3-2 DIV. 25

*VOCABULARY

(*INFORMATION RETRIEVAL, *VOCABULARY;)
COMPUTATION LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 816 62-3-2 DIV. 32

*VOICE COMMUNICATION SYSTEMS

(*VOICE COMMUNICATION SYSTEMS; *DIGITAL SYSTEMS; DATA STORAGE SYSTEMS; *SPEECH TRANSMISSION; CODING; INTELLIGIBILITY; AUDIOFREQUENCY; SIDEBANDS; DESIGN; TESTS;) (TRANSISTOR AMPLIFIERS; BAND-SELECTIVE AMPLIFIERS; BAND-PASS AMPLIFIERS; BAND-PASS FILTERS; ACOUSTIC FILTERS; TIMING CIRCUITS;) (PULSE GENERATORS; *PULSE MODULATION; PULSE TRANSMITTERS; CRYSTAL OSCILLATORS; *DATA PROCESSING SYSTEMS; *ANALOG-TO-DIGITAL CONVERTERS;)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
AD-274 466 62-3-2 DIV. 5

(*VOICE COMMUNICATION SYSTEMS; PHASE MODULATION; MODULATORS; DETECTORS; MODEL TESTS; DESIGN;) (COMMUNICATION SYSTEMS; TELEPHONE LINES; TELEPHONE COMMUNICATION SYSTEMS; DIGITAL SYSTEMS; DATA TRANSMISSION SYSTEMS; DATA PROCESSING SYSTEMS; COMPUTER LOGIC; CODING;) (ELECTRONIC CIRCUITS; SWITCHING CIRCUITS; TIMING CIRCUITS; PULSE TRANSMITTERS; PULSE INTEGRATORS;)
INTERNATIONAL BUSINESS MACHINES CORP., ROCKVILLE, MD.
AD-274 660 62-3-2 DIV. 5

*VORTICES

(*VORTICES IN CONDENSATION TRAILS OF *HYPERVELOCITY PROJECTILES; *PELLETS IN XENON; BLUNT BODIES IN *SUBSONIC FLOW AND *HYPERSONIC FLOW AT LOW REYNOLDS NUMBER; SELF LUMINESCENCE; PHOTOGRAPHS OF TURBULENT FLOW; HYPERSONICS; WAKE;
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 535 62-3-2 DIV. 9

(AIRFOILS; *WINGS; AERODYNAMICS; SUBSONIC FLOW; TRANSONICS; GUSTS FROM BLAST; SHOCK WAVES; STALLING; *VORTICES; MODEL TESTS; WIND TUNNEL MODELS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 578 62-3-2 DIV. 9

(CYLINDRICAL BODIES; *BODIES OF REVOLUTION; OGIVE; WIND TUNNEL MODELS; SUBSONIC FLOW; LOAD DISTRIBUTION; INTERFERENCE; *VORTICES; WAKES; MODEL TESTS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 587 62-3-2 DIV. 9

*WARFARE

(*COMBAT; **WARFARE; *GAMES THEORY; EQUATIONS; DIGITAL COMPUTERS;) (COMMUNICATION SYSTEMS; MILITARY COMMUNICATIONS; MILITARY INTELLIGENCE; DETERIORATION; SIMULATION; *MILITARY OPERATIONS;)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 739 62-3-2 DIV. 18

*WAVE TRANSMISSION

(*COMMUNICATION SYSTEMS; TESTS; *STANDARDS; DESIGN; THEORY; TEST METHODS;) (**WAVE TRANSMISSION; RADIO WAVES; SCATTERING BY IONOSPHERE; ATMOSPHERE AND METEORS; VERY LOW FREQUENCY; IONOSPHERIC PROPAGATION; TRANSMISSION LINES; RADIOFREQUENCY CABLES; SATELLITE VEHICLES; RADIO TRANSMISSION; MICROWAVE RELAY SYSTEMS; RADIO RELAY SYSTEMS;) (*RADIO COMMUNICATION SYSTEMS; *MICROWAVE COMMUNICATION SYSTEMS; COMMUNICATION EQUIPMENT; COSTS; MATHEMATICAL ANALYSIS; SPECIFICATIONS;) RELIABILITY.
MINNEAPOLIS-HONEYWELL REGULATOR CO., SEATTLE, WASH.
AD-274 545 62-3-2 DIV. 5

(*COMMUNICATION SYSTEMS FOR *SPACE FLIGHT;) (ULTRA HIGH FREQUENCY; *RADIO WAVES; **WAVE TRANSMISSION; IONOSPHERIC PROPAGATION; IONIZATION FROM SOLAR FLARES; MULTIPATH TRANSMISSION; ATTENUATION;) (*RADIO SIGNALS FROM TELEMETERING TRANSMITTERS ON LUNAR PROBES; SPACE PROBES; PROPAGATION; TESTS; MEASUREMENT;) (*COMMUNICATIONS THEORY; RADIO INTERFERENCE; *NOISE (RADIO); RADIO SIGNALS; ERRORS; MATHEMATICAL ANALYSIS;) (PHASE DETECTORS; *PHASE MEASUREMENT; SIGNAL-TO-NOISE RATIO;) (REDUCTION OF *RADIO INTERFERENCE DUE TO SOLAR NOISE;)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 826 62-3-2 DIV. 5

*WAVEGUIDE COUPLERS

(*POWER DIVIDERS; *WAVEGUIDE COUPLERS; *MICROWAVE EQUIPMENT; WAVEGUIDE JOINTS; THEORY; DESIGN;) (**WAVEGUIDES; *COAXIAL CABLES; IMPEDANCE MATCHING; PHASE MEASUREMENT;) ANTENNAS;
HERRIMAC RESEARCH AND DEVELOPMENT, INC., IRVINGTON, N. J.
AD-274 493 62-3-2 DIV. 8

*WAVEGUIDE FILTERS

(DESIGN; THEORY; **WAVEGUIDE FILTERS; **WAVEGUIDE JOINTS FOR *MULTIPLEX TRANSMISSION; MULTIPLE OPERATION; RADIO TRANSMITTERS; RADIO RECEIVERS; RADAR TRANSMITTERS; RADAR RECEIVERS; ULTRA HIGH FREQUENCY; SUPERHIGH FREQUENCY; MICROWAVE FREQUENCY;) SWITCHING CIRCUITS; COAXIAL FILTERS; *POWER DIVIDERS; WAVEGUIDE COUPLERS; TRANSMISSION LINES; MATHEMATICAL ANALYSIS.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 824 62-3-2 DIV. 8

*WAVEGUIDE JOINTS

(DESIGN; THEORY; **WAVEGUIDE FILTERS; **WAVEGUIDE JOINTS FOR *MULTIPLEX TRANSMISSION; MULTIPLE OPERATION; RADIO TRANSMITTERS; RADIO RECEIVERS; RADAR TRANSMITTERS; RADAR RECEIVERS; ULTRA HIGH FREQUENCY; SUPERHIGH FREQUENCY; MICROWAVE FREQUENCY;) SWITCHING CIRCUITS; COAXIAL FILTERS; *POWER DIVIDERS; WAVEGUIDE COUPLERS; TRANSMISSION LINES; MATHEMATICAL ANALYSIS.

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 824 62-3-2 DIV. 8

*WAVEGUIDES

(*POWER DIVIDERS; *WAVEGUIDE COUPLERS; *MICROWAVE EQUIPMENT; WAVEGUIDE JOINTS; THEORY; DESIGN;) (**WAVEGUIDES; *COAXIAL CABLES; IMPEDANCE MATCHING; PHASE MEASUREMENT;) ANTENNAS;
HERRIMAC RESEARCH AND DEVELOPMENT, INC., IRVINGTON, N. J.
AD-274 493 62-3-2 DIV. 8

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN;) (**WAVEGUIDES; MICROWAVE FREQUENCY; RADAR DUPLEXERS; *WAVEGUIDE COUPLERS; *WAVEGUIDE WINDOWS; *MICROWAVE EQUIPMENT; GASES; PRESSURE; TEMPERATURE; COOLING BY CONVECTION; *WAVEGUIDE FILTERS; SURFACE PROPERTIES; ANALYSIS;) (PROPAGATION; WAVE TRANSMISSION; ATTENUATION; ABSORPTION;)
MICROWAVE RESEARCH ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 819 62-3-2 DIV. 8

(*TRANSMISSION LINES; MICROWAVES; S BAND; *RADIOFREQUENCY POWER; DESIGN.) (*WAVEGUIDES; MICROWAVE FREQUENCY; CAVITY RESONATORS; *MICROWAVE EQUIPMENT; WAVEGUIDE COUPLERS; WAVEGUIDE IRISES; TEMPERATURE; PRESSURE; COOLING; FINS; CONVECTION; LIQUID COOLED; WAVEGUIDE FILTERS; HEAT TRANSFER; COOLANT; COOLANT PUMPS; HEAT EXCHANGERS.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 828 62-3-2 DIV. 8

(*WAVEGUIDES; S BAND; X BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (WAVEGUIDE JOINTS; WAVEGUIDE BENDS; CAVITY RESONATORS; AIR; ELECTRIC FIELDS.) (MICROWAVES; PROPAGATION; ATTENUATION.) (*HEAT TRANSFER; COOLING; TEMPERATURE; GASES; PRESSURE.) (HARMONIC ANALYSIS; MATHEMATICAL ANALYSIS; MEASUREMENT; TEST EQUIPMENT.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 821 62-3-2 DIV. 8

(*WAVEGUIDES; C BAND; K BAND; ELECTRICAL PROPERTIES; RELIABILITY; TEST METHODS.) (WAVEGUIDE JOINTS; WAVEGUIDE COUPLERS; WAVEGUIDE WINDOWS; *CAVITY RESONATORS; FREQUENCY SHIFT; TUNING DEVICES; ELECTRIC FIELDS; MAGNETRONS; *RADIOFREQUENCY POWER; PRESSURE; GASES; AIR; MEASUREMENT; *MICROWAVES; TEMPERATURE; TEST EQUIPMENT; *HANDBOOKS.)
MICROWAVE ASSOCIATES, INC., BURLINGTON, MASS.
AD-274 822 62-3-2 DIV. 8

**WIND

(*WIND; STATISTICAL ANALYSIS.)
ARMY ORDNANCE MISSILE COMMAND, REDSTONE ARSENAL, HUNTSVILLE, ALA.
AD-274 660 62-3-2 DIV. 2

(HIGH ALTITUDE; *WIND; PERIODIC VARIATIONS; CALIFORNIA.) (EFFECT ON LAUNCHING; GUIDED MISSILES; STATISTICAL ANALYSIS.)
AIR WEATHER SERVICE (MATS) ANDREWS AFB, WASHINGTON, D. C.
AD-274 509 62-3-2 DIV. 2

(NORTHERN HEMISPHERE; *STRATOSPHERE; *WIND; TEMPERATURE; BAROMETRIC PRESSURE; METEOROLOGICAL CHARTS.)
FREE U., BERLIN (GERMANY).
AD-274 658 62-3-2 DIV. 2

(WEATHER FORECASTING; *JET STREAMS (METEOROLOGY); NORTHERN HEMISPHERE.) (*WIND; METEOROLOGICAL DATA; SAMPLING.)
WISCONSIN U., MADISON.
AD-274 773 62-3-2 DIV. 2

(EUROPE; *WIND; HIGH ALTITUDE; STATISTICAL ANALYSIS.) (CLIMATE; CLASSIFICATION.)
WISCONSIN U., MADISON.
AD-274 774 62-3-2 DIV. 2

(EUROPE; HIGH ALTITUDE; *WIND; STATISTICAL ANALYSIS.) (CLIMATE; CLASSIFICATION.)
WISCONSIN U., MADISON.
AD-274 775 62-3-2 DIV. 2

**WIND TUNNELS

(*WIND TUNNELS; WIND TUNNEL MODELS; SUPERSONICS; AERODYNAMICS; TURBULENT BOUNDARY LAYER; NOISE; PRESSURE; INSTRUMENTATION; OSCILLATION; ORIFICES; *WIRE.)
JOHNS HOPKINS U., BALTIMORE, MD.
AD-274 667 62-3-2 DIV. 9

**WING-BODY CONFIGURATIONS

(*CYLINDRICAL BODIES; BODIES OF REVOLUTION; *WING-BODY CONFIGURATIONS; SWEPT WINGS; WIND TUNNEL MODELS; SUPERSONICS; HYPERSONICS; *AERODYNAMIC HEATING; *HEAT TRANSFER; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 503 62-3-2 DIV. 9

(*CANARD CONFIGURATION; *WING-BODY CONFIGURATIONS; AIRPLANES; SWEPT WINGS; WIND TUNNEL MODELS; STABILITY (LONGITUDINAL); CONTROL; EFFECTIVENESS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 585 62-3-2 DIV. 9

(*RING WINGS; *WING BODY CONFIGURATIONS; WIND TUNNEL MODELS; AERODYNAMICS; SUPERSONICS; LIFT; DRAG; PITCH; MOMENTS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 586 62-3-2 DIV. 9

**WINGS

(*WINGS; WIND TUNNEL MODELS; AERODYNAMICS; MOMENTS; PRESSURE; OSCILLATION; PITCH; LIFT; RESONANCE; SUBSONIC FLOW; SUPERSONICS; TRANSONICS; MATHEMATICAL ANALYSIS; THEORY; INTEGRAL EQUATIONS; MODEL TESTS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 577 62-3-2 DIV. 9

(AIRFOILS; *WINGS; AERODYNAMICS; SUBSONIC FLOW; TRANSONICS; GUSTS FROM BLAST; SHOCK WAVES; STALLING; *VORTICES; MODEL TESTS; WIND TUNNEL MODELS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 578 62-3-2 DIV. 9

**WIRE

(*WIRE; *DETONATION; *PROPULSION; *PROPELLANTS; GAS DISCHARGES; SATELLITE VEHICLE RESEARCH.) (INSTRUMENTATION; PHOTOMULTIPLIERS; *SCHLIEREN PHOTOGRAPHY; SPECTROGRAPHIC CAMERAS.) (FEASIBILITY STUDIES; TESTS.)
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 643 62-3-2 DIV. 25

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-274 546 Div. 1, 9
(TISTA/WAW) OTS price $2.60

Hydronautics, Inc., Rockville, Md.
DYNAMIC HEAVING MOTION OF GROUND EFFECT MACHINES,
by W. C. Webster and J. D. Lin. Mar 62, 18p. illus. 2 refs. (Technical rept. no. 011-3)
(Contract Nonr-318900)
Unclassified report

DESCRIPTORS: (*Flying platforms, Ground effect, Aerodynamics, Subsonic flow, Dynamics, Equations, Motion, Oscillation, Mathematical analysis.)

The dynamics of simple ground effect machines undergoing heaving motion over a wavy surface is formulated. (Author)

AD-274 569 Div. 1, 9
(TISTA/VGW) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF FLUTTER AND DIVERGENCE OF SPRING-MOUNTED CONE CONFIGURATIONS AT SUPERSONIC SPEEDS,
by John L. Sewall, Robert W. Hess, and Charles E. Watkins. Apr 62, 53p. incl. illus. tables, 13 refs. (Technical note D-1021)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1021.

DESCRIPTORS: (Model tests, Mathematical analysis of Flutter and Pitch of Wind tunnel models *Conical bodies on Springs.) (Aerodynamics, Bodies of revolution, Boundary layer, Shock waves, Downwash, Supersonics.)

The results are reported of an analytical and experimental study of flutter and static divergence of a rigid conical shell mounted on springs that permitted freedom in vertical translation and pitch. (Author)

AD-274 837 Div. 1, 33, 18
(TISTA/VGW) OTS price $9.60

Ryan Aeronautical Co., San Diego, Calif.
STRUCTURAL DESIGN STUDY OF A GROUND EFFECT MACHINE FOR AMPHIBIOUS SUPPORT.
Final rept.,
by A. D. LeBaron. 16 Feb 62, 110p. incl. illus. tables, 11 refs. (Rept. no. 62B009)
(Contract Nonr-306800)
Unclassified report

DESCRIPTORS: (Design of Ground effect, Amphibian planes, *Flying platforms for Amphibious operations, Cargo vehicles.) (Aerodynamic configurations, Monocoques, Airframes, Jet propulsion, Load distribution, Control systems, Airplane landings, Analysis.) (Mathematical analysis, Structures, Stresses.)

The results of a structural design study of a GEM for amphibious support are reported. The intent of the study was to establish a GEM configuration suitable for amphibious support, perform structural analysis to determine the required size of structural components and provide the drawings and data necessary to describe the vehicle, the type of structure and method of construction. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-274 460 Div. 2
(TISTP/FR) OTS price $7.60

Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.
ON DEFINING AND COMPUTING THE MEAN AND THE STANDARD DEVIATION FOR WIND DIRECTIONS,
by Oskar M. Essenwanger. 15 Feb 61, 75p. incl. illus. tables, 5 refs. (Rept. no. RR-TR-61-1)
Unclassified report

DESCRIPTORS: (*Wind, Statistical analysis.)

The possibility of using wind direction data without conversion into components was investigated, and the mean value and the standard deviation data were computed. A program is described for the methods of solution and is demonstrated by using wind data for Washington, D. C., as an example. (Author)

AD-274 462 Div. 2
(TISTP/FR) OTS price $1.60

Geophysical Inst., U. of Alaska, College.
THE POLAR CAP ABSORPTION EVENTS OF JULY 11-20, 1961,
by H. Leinbach. Mar 62, 15p. illus. 12 refs.
(Scientific rept. no. 2; Rept. no. UAG-R126)
(NSF Grant no. G14133)
Unclassified report

DESCRIPTORS: (*Extraterrestrial radio waves, Attenuation, Ionosphere, Solar energy, *Protons, Solar flares, Magnetic storms.)

The polar cap absorption of July 12 has been classed as an SC-max event, showing maximum absorption after the SC associated with the cosmic ray flare. The PCA of July 18 belongs to the class of pre-SC-max events, with the maximum absorption attained well before the associated SC storm. Recently available data from the satellite Injun I shows that the characteristics of the two events are in agreement with the magnitudes of the flux of protons below 15 Mev relative to the total flux above 40 Mev; the July 12 PCA was a low energy event, that of July 18 a high energy event. (Author)

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-274 463 Div. 2
(TISTP/FR) OTS price $5.60

Geophysical Inst., U. of Alaska, College.
THE AURORAL DISPLAY OF FEBRUARY 13-14, 1958,
by T. N. Davis and D. S. Kimball. Jan 62, 24p. illus. 11 refs. (Scientific rept. no. 2; Rept. no. UAG-R120)
(NSF Grant no. G14782)
Unclassified report

DESCRIPTORS: (*Aurorae, Terrestrial magnetism, Ionosphere, Electric currents, Maps.)

Detailed synoptic maps of the auroral display of February 13-14, 1958 are presented. These maps depict both the auroral configurations and the magnitude and direction of magnetic disturbance at intervals of five minutes as determined from several observing stations in Alaska. The maps demonstrate pronounced but imperfect relationships of the position, magnitude, and orientation of magnetic disturbance with the position, intensity, and configuration of auroral forms. (Author)

AD-274 477 Div. 2
(TISTP/FR) OTS price $1.60

General Dynamics/Astronautics, San Diego, Calif.
REENTRY AND DISPOSAL PHENOMENA FOR NUCLEAR AUXILIARY POWER SYSTEMS: COMPILATION OF ATMOSPHERIC PARAMETERS OF INTEREST.
by E. Philbin and M. Downing. Mar 62, 20p. incl. illus. table, 5 refs.
(Contract AF 29(601)4893, Proj. 1831)
(AFSWC TDR 62-35) Unclassified report

DESCRIPTORS: (Wind, Gases, Barometric pressure, Density, Sound, Velocity, Thermal conductivity.) *Atmosphere models.

Data are presented on the variation with altitude of atmospheric physical properties required in analyzing the re-entry burnup behavior of nuclear auxiliary power system components. These data are based on the 1956 and 1959 ARDC Model Atmospheres. Also included is information on prevailing winds, necessary in computing the diffusion of burnup debris. (Author)

AD-274 485 Div. 2
(TISTP/FR) OTS price $6.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
STRUCTURE AND ATTENUATION OF HYDROMAGNETIC EMISSIONS, VOLUME II,
by Lee R. Tepley and R. C. Wentworth. 6 Apr 62, 80p. incl. illus. (Scientific rept. no. 1; 2-62-1, vol. 2)
(Contract AF 19(604)5906, Proj. 5631)
(AFCRL-62-32, vol. 2) Unclassified report

DESCRIPTORS: (*Terrestrial magnetism, Propagation, Ionosphere, Tables.) (Magnetohydrodynamics, Radio waves.)

AD-274 486 Div. 2, 8
(TISTP/FR) OTS price $6.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
STRUCTURE AND ATTENUATION OF HYDROMAGNETIC EMISSIONS. VOLUME I.
by Lee R. Tepley. 6 Apr 62, 67p. incl. illus. 14 refs. (Scientific rept. no. 1, vol. 1; 2-62-61-1, vol. 1)
(Contract AF 19(604)5906)
(AFCRL 62-32, vol. 1) Unclassified report

DESCRIPTORS: (*Terrestrial magnetism, Propagation, Ionosphere.) Magnetometers.

Experimentally observed properties of hydromagnetic emissions, which are geomagnetic fluctuations in the frequency range 0.5 to 5 cps, are discussed. Results are presented of a frequency-time analysis of selected events which occurred during both magnetically quiet and disturbed periods. The observation that most hm emissions are characterized by a fine structure consisting of a superposition of short wave trains of rapidly increasing frequency is of particular interest. Also presented are the results of a statistical analysis relating the following quantities as observed simultaneously: (1) Times of occurrence of the emissions, (2) Conditions in the ionosphere overhead, and (3) Geomagnetic activity. It is concluded that the characteristics of the signals are consistent with their generation above the ionosphere and their subsequent transmission downward by hydromagnetic waves. Results are also included of geomagnetic fluctuations observed in the frequency range 5 to 25 cps. Bands of enhanced activity, associated with the earth-ionosphere cavity resonances, are found at frequencies near 7, 14, and 20 cps. (Author)

AD-274 487 Div. 2
(TISTP/FR) OTS price $14.50

Massachusetts Inst. of Tech., Cambridge.
STRATOSPHERIC WIND TEMPERATURE AND ISOBARIC HEIGHT CONDITIONS DURING THE IGY PERIOD, PART I.
Rept. on Planetary Circulations Project,
by Takio Murakami. 15 Feb 62, 13p. incl. illus. tables, 8 refs. (Rept. no. 5)
(Contract AF 19(604)5223)
Unclassified report

DESCRIPTORS: (*Stratosphere, Wind, Temperature, Periodic variations, *Meteorological charts.)

The lower stratospheric conditions for the first six months of the IGY are given. The geographical distribution of several statistical quantities which might be useful for the understanding of the general circulation in the lower stratosphere are presented. The vertical and latitudinal dependence of the zonal mean values of several meteorological quantities are also included. (Author)

AD-274 494 Div. 2
(TISTP/FR) OTS price $9.60

Round Hill Field Station, Mass. Inst. of Tech., South Dartmouth.
STUDIES OF THE SPECTRA OF THE VERTICAL FLUXES OF MOMENTUM, HEAT, AND MOISTURE IN THE ATMOSPHERIC BOUNDARY LAYER.
Final rept.,
by Harrison E. Cramer, Frank A. Record, and James E. Tillman. Apr 62, 112p. incl. illus. tables, 17 refs.
(Contract DA 36-039-sc-80209)
Unclassified report

DESCRIPTORS: (*Atmosphere, Temperature, Water vapor, *Turbulence, Boundary layer, Wind, Measurement, Statistical analysis.) Hygrometers.

The spectra of the vertical fluxes of momentum, heat and water vapor in the atmospheric boundary layer under various thermal stratifications and surface roughness are presented.

AD-274 509 Div. 2
(TISTP/GRW) OTS price $4.60

Air Weather Service (MATS) Andrews AFB, Washington, D. C.
ANALYSIS OF UPPER AIR WINDS FOR VANDENBERG AFB.
1 May 62, 42p. incl. illus. tables (Rept. no. 4WGP 105-13-1)
Unclassified report

DESCRIPTORS: (High altitude, *Wind, Periodic variations, California.) (Effect on Launching, Guided missiles, Statistical analysis.)

An analysis of upper-level wind data was performed to provide wind profiles for Vandenberg AFB which will be suitable for defining various range-safety criteria as well as in determining limitations and capacity for space-vehicle launches at the Vandenberg AFB/Point Arguello facilities. Wind profiles are presented which show the 1%, 5%, 10% and 20% profile values for components of wind from each of the four cardinal directions. Annual profiles as well as profiles for each of the four seasons of the year are presented. Summarized wind data for individual levels of the atmosphere to and including 26,000 meters (85,300 ft) were analyzed independently to obtain the profiles. (Author)

AD-274 537 Div. 2
(TISTP/FR) OTS price $2.60

McGill U. (Canada).
RELATION BETWEEN SOLAR RADIATION INCOME AND CLOUD TYPE IN THE ARCTIC,
by E. Vowinckel and Svenn Orvig. Mar 62, 26p. incl. illus. tables, 16 refs. (Publication in Meteorology no. 48; Scientific rept. no. 3)
(Contract AF 19(604)7415, Proj. 8623)
(AFCRL 62-422) Unclassified report

DESCRIPTORS: (Arctic regions, *Albedo (Astronomy), Clouds, Infrared radiation.)

Cloud amount and duration of sunshine are generally used to estimate direct and diffuse solar radiation income at the ground, where radiation instruments are not available. This method has serious drawbacks and a consideration of cloud type is also necessary. The different elements required for the calculation of radiation income at the ground are discussed. Such calculation can give only general results, and measured values of radiation in the Arctic, with different cloud types, are presented. The magnitude is discussed, of the values in the Arctic of albedo of cloud tops, water content of clouds, ground albedo, and the effect of composite cloud types. From the results it is possible to construct tables which show the depletion factor with 10/10 cloud cover for different combinations of cloud type frequencies. (Author)

AD-274 563 Div. 2, 30, 8, 12
(TISTA/VGW) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
INSTRUMENTATION OF THE IONOSPHERE DIRECT MEASUREMENTS SATELLITE (EXPLORER VIII),
by R. E. Bourdeau, J. L. Donley, and E. C. Whipple, Jr. Apr 62, 34p. incl. illus. tables, 2 refs. (Technical note no. D-414)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-414.

DESCRIPTORS: (Instrumentation of *Satellite vehicles, Space probes for Measurement of *Ionosphere, *Space environmental conditions including Particles, Ions, Electrons, Density, Temperature.) (*Geophysics, Terrestrial magnetism, Plasma physics, Tests.) (Flight testing of Satellite attitude, Detectors.)

This paper describes the ionosphere direct measurements satellite Explorer VIII, with emphasis on the physics of the experiments designed to measure electron density (RF impedance probe), electron temperature (electron temperature probe), positive ion concentration (ion current monitor), and ion mass (retarding potential probe). Experiments were also performed which measured the momentum, energy, and spatial distribution of dust particles. Experimental data presented are typical of that processed to date. Methods used by systems engineers to fulfill the special requirements imposed by the scientific experiments upon the over-all satellite design are described; and data such as the satellite's thermal and spin-decay history are reported. Of interest to spacecraft technologists concerned with the influence of the earth's magnetic field are measurements on effects of potential differences at various points on the satellite surface. A method for determining satellite aspect is also introduced. (Author)

AD-274 594 Div. 2
(TISTP/FR) OTS price $5.60

Rand Corp., Santa Monica, Calif.
THE GRAVITATIONAL CONCENTRATION OF PARTICULATE MATTER IN THE SPACE NEAR THE EARTH,
by S. H. Dole. Apr 62, 48p. incl. illus. tables, 21 refs. (Memo. no. RM-2879-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Meteors, Exosphere, Upper atmosphere, Gravity.)

A theory that the observed concentration of micrometeoritic material around the earth can be attributed entirely to the earth's gravitational field is presented. (Author)

AD-274 599 Div. 2
(TISTP/FR) OTS price $3.60

The RAND Corp., Santa Monica, Calif.
IDEALIZED SHEATH THEORY AND SATELLITE CHARGE-UP IN THE VAN ALLEN REGION,
by G. E. Modesitt. Apr 62, 31p., 11 refs.
(Memo. no. RM-3096-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Van Allen radiation belt, *Satellite vehicles, *Electrostatic fields, Electric potential, Protons, Electrons.)

As an aid in the determination of the electric potential of naturally charged satellites, the concept of the idealized sheath introduced by Langmuir and Mott-Smith is studied in some detail through the use of distribution functions. It is shown that the functions are discontinuous in velocity variables and lead to the same results as particle trajectory theory. The limitations of the sheath theory and its connection with space-charge-limited diode theory are discussed. It is shown that, under certain assumptions, the potential on a satellite whose diameter is smaller than the local Debye length will reach 3500 volts

negative in the more intense regions of the Van Allen electron belt. The equilibrium potential decreases with increasing size of the satellite, with a limiting value of -35,000 volts for satellites much greater than the Debye length in diameter. (Author)

AD-274 638 Div. 2
(TISTP/FR) OTS price $7.60

Air Weather Service, Scott Air Force Base, Ill
TERMINAL FORECAST MANUAL. DETACHMENT 6, 4TH WEATHER SQUADRON, 4TH WEATHER WING, NORTON AIR FORCE BASE, CALIFORNIA.
Rev. Jan 62, 1v. incl. illus. tables.
Unclassified report

DESCRIPTORS: (California, Fog, Clouds, Haze, Precipitation, Wind.) (*Climate, Periodic variations.)

AD-274 652 Div. 2
(TISTP/FR) OTS price $15.50

Air Force Cambridge Research Labs., Bedford, Mass.
SPACE AND PLANETARY ENVIRONMENTS,
ed. by Shea L. Valley. Jan 62, 220p. incl. illus. 63 refs. (Air Force Surveys in Geophysics no. 139; AFCRL 62-270)
Unclassified report

DESCRIPTORS: (*Interstellar matter, Magnetic fields, Terrestrial magnetism, Gravity, Solar energy, Van Allen radiation belts, Ultraviolet radiation, Sun.) (Moon, Planetary atmospheres, Terrain, Geology.) (Mars, Venus, Jupiter, Saturn, Uranus, Pluto.) (Galaxies, Stars, Spectrographic analysis.) (*Astronomy, *Astrophysics.) *Planets.

Contents:
Interplanetary gas and magnetic fields
The terrestrial magnetic field
The external terrestrial gravity field
Corpuscular radiation in the vicinity of Earth
Solar electromagnetic radiation
The lunar environment
Planetary environments
Space environment of the solar system

AD-274 658 Div. 2
(TISTP/FR) OTS price $9.10

Free U., Berlin (Germany).
PRELIMINARY DAILY NORTHERN HEMISPHERE 10 - MILLIBAR SYNOPTIC WEATHER MAPS OF THE YEAR 1961.
PART IV: OCTOBER-DECEMBER.
Quarterly technical status rept. no. 4,
by Karin Labitzke-Behr, Zdravko Petkovsek and others. 1962, 1v. incl. illus. (Meteorologische Abhandlungen Band 20, Heft 4)
(Contract DA 91-591-EUC-1700, Proj. 01-7450-61)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (Northern hemisphere, *Stratosphere, *Wind, Temperature, Barometric pressure, Meteorological charts.)

AD-274 698 Div. 2
(TISTP/FR) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
OUTER VAN ALLEN BELTS AND NEUTRAL POINTS ON INTERFACE BETWEEN SOLAR WIND AND GEOMAGNETIC FIELD,
by C. C. Chang. 1 Mar 62, 10p. incl. illus. 23 refs. (Rept. no. TDR-930(2230-05)TN-3)
(Contract AF 04(647)930)
(DCAS TDR 62-38) Unclassified report

DESCRIPTORS: (*Terrestrial magnetism, Magnetic fields, Solar energy, Protons, *Van Allen radiation belt.)

The two N-1 (neutral) points are believed to be the key mechanisms of trapping high-energy particles in the outer Van Allen belts. Their neighborhoods allow the solar wind plasma to seep into the geomagnetic field without reflection. Their instability causes the connected interface to oscillate locally, inducing magnetohydrodynamic waves which increase the energy of the trapped particles to much higher levels in succeeding steps. Even when the solar wind is not steady, the above conclusions are expected to be valid, except that the interface may change its position. Furthermore, those mechanisms of trapped particles and boosting energy become more effective. (Author)

AD-274 724 Div. 2, 8
(TISTP/FR) OTS price $3.60

Chalmers U. of Tech. (Sweden).
ARTIFICIAL HEATING OF THE ELECTRONS IN THE F REGION OF THE IONOSPHERE,
by D. T. Farley. 1961, 20p. incl. illus. tables, 9 refs. (Rept. no. US 23)
(Contract AF 61(052)451)
(AFCRL 62-122) Unclassified report

DESCRIPTORS: (*Ionosphere, Electrons, Heating, *Radio beams.)

If a powerful radio beam were transmitted at a frequency very close to the penetration frequency of the ionosphere, a large amount of absorption would take place in the F region, and this, coupled with the very slow loss of heat by the electrons, could lead to a significant increase in the electron temperature. Preliminary calculations indicate that it should be possible to produce easily detectable increases by using an antenna with an effective area of about 40,000 sq.m. to transmit an average power of perhaps as little as 50 kilowatts and certainly not more than a few hundred kilowatts. The exact temperature increase will depend on the actual values of the collision frequency and the electron density in the layer. (Author)

AD-274 730 Div. 2, 6
(TISTP/JW) OTS price $3.60

Florida State U., Tallahassee.
ON THE MAXIMUM VERTICAL EXTENT OF CONVECTIVE CLOUDS,
by C. L. Jordan. 15 Apr 62, 34p. incl. illus. tables, 32 refs.
(Contract N189-50775A)
Unclassified report

DESCRIPTORS: (*Cloud height indicators, Meteorological radar, *Convection, Errors, Radar echo areas.) (Radar scanning, *Height finding, Echo ranging.)

An attempt is made to examine the credibility and explore the implications of the reports of convective clouds to extreme heights which have been indicated by radar in recent years. The extreme cases have not been verified by independent observations and it is shown that inherent limitations in radar observations of convective cloud heights are such as to raise serious doubts in regard to the accuracy of many of the extreme echo heights which have been reported. (Author)

AD-274 737 Div. 2
(TISTP/FR) OTS price $1.60

Kiruna Geophysical Observatory (Sweden).
DRIFT MOTIONS OF AURORAL IONIZATION,
by Alv Egeland. 20 Oct 61, 11p. illus. 13 refs. (Scientific rept. no. 7)
(Contract AF 61(052)418)
(AFCRL 62-116) Unclassified report

DESCRIPTORS: (*Aurorae, Ionization, Drift, Measurement, Radio waves, Reflection.)

The drift velocities ranged from about 0.6 to 5-6 km/s, with a median speed estimated to be about 2 km/s. The drift effects of auroral ionization, lying inside the auroral zone, were considerably irregular, quite different from the regular character observed at latitudes between 50 and 60 degrees. In the time-interval between 22-02, and especially between 02-06 MET, the echoes were usually obtained from about 5-10 degrees farther east of north than during the rest of the day, during which the average distribution of the echoes seemed to be relatively constant. For some of the recordings obtained by means of the rotating antenna, a striking oscillation of the reflecting center was found. (Author)

AD-274 738 Div. 2, 8
(TISTP/FR) OTS price $3.60

Kiruna Geophysical Observatory (Sweden).
A STUDY OF THE STATISTICS OF VHF OBLIQUE AURORAL REFLECTIONS,
by Alv Egeland, Johannes Ortner, and Bengt Hultqvist. 20 Oct 61, 21p. illus. tables, 28 refs. (Scientific rept. no. 8)
(Contract AF 61(052)418)
(AFCRL 62-117) Unclassified report

DESCRIPTORS: (*Aurorae, Radio waves, Very high frequency, Reflection, Diurnal variations, Periodic variations, *Terrestrial magnetism.)

Oblique auroral echoes at 92.8 Mc from the Kemi FM-transmitter station, situated 310 km south-southeast of Kiruna, were investigated at Kiruna Geophysical Observatory for more than two years of continuous recordings (October, 1957 to May, 1960). The results of the investigation of VHF aurorally propagated transmission with regard to diurnal, day-to-day and seasonal variation, as well as the duration and the signal strength of the echoes are reported. The correlation with solar and magnetic disturbances has also been studied. (Author)

AD-274 770 Div. 2
(TISTP/JW) OTS price $2.60

Geophysical and Polar Research Center, U. of Wisconsin, Madison.
GEOPHYSICAL STUDIES IN VICTORIA LAND, ANTARCTICA, by John G. Weihaupt. Oct 61, 123p. incl. illus. tables, 35 refs. (Research rept. no. 1)
Unclassified report

DESCRIPTORS: (*Antarctic regions, Geophysics, *Geography, Geological survey, Glaciers.)

The geoscientific results of the Victoria Land Traverse, 1959-60 are presented with interpretations and conclusions. The major geographical discoveries, the Arctic Institute Range and the Rennick Glacier, are treated and descriptions and locations given. The presence of a vast ice thickness, which in many cases exceeds 2.0 km. is reported covering Victoria Land and is shown to conceal a major subglacial depression. Subglacial rock topography influences the relief of the ice surface of Victoria Land as seen upon comparison of seismic and altimetric results. The presence of prolonged seismic surface noise is reported and attributed to low temperature phenomena. (Author)

AD-274 773 Div. 2
(TISTP/JW) OTS price $5.60

Wisconsin U., Madison.
THE JET STREAM AS A STRATIFICATION PARAMETER FOR THE 500 mb GEOSTROPHIC WIND FIELD OVER EUROPE,
by Lyle H. Horn and Donald R. Johnson. Oct 61, 20p. illus. 8 refs. (Scientific rept. no. 6)
(Contract AF 19(604)5191)
(AFCRL TN 61-1002) Unclassified report

DESCRIPTORS: (Weather forecasting, *Jet streams (Meteorology), Northern hemisphere.) (*Wind, Meteorological data, Sampling.)

The latitude at which the jet stream crosses the Greenwich Meridian was used as a stratification parameter for the 50 0mb geostrophic wind field over an area extending from 0 to 75 E longitude and from 35 N to 65 N latitude for the period November through March (1945-1952). The data were arbitrarily partitioned into dependent and independent samples. The dependent sample has been used to obtain four classes of data based on the latitude of the jet stream at 0 longitude, while the independent sample was used to determine the reduction in error of prediction attained by using the class means rather than the mean of the entire sample as predictors of the geostrophic wind at 56 points in the predicted area. In the western half of the predicted area significant reductions in variance (dependent sample) and reductions in error of prediction (independent sample) are attained by the stratification method. Thirty-two maps are included. (Author)

AD-274 774 Div. 2
(TISTP/FR) OTS price $6.60

Wisconsin U., Madison.
STRATIFICATION OF THE 300 mb GEOSTROPHIC WIND FIELD BY GROSSWETTER TYPES,
by Donald R. Johnson and Lyle H. Horn. Dec 61, 58p. incl. illus. tables, 11 refs. (Scientific rept. no. 7)
(Contract AF 19(604)5191)
(AFCRL TN 61-1003) Unclassified report

DESCRIPTORS: (Europe, *Wind, High altitude, Statistical analysis.) (Climate, Classification.)

As an experiment in stratified climatology, Grosswetter types and the combination of Grosswetter types into larger classes were used as

predictors for the 300-mb geostrophic winds over Eastern Europe. Eight years of winter season data (1950-1957) and data for March 1958 were used. Forecasts using stratified data were compared with those of unstratified data by analysis of the reduction in error statistic. Certain Grosswetter types and the combination of Grosswetter types have shown significant improvement over climatology for limited areas, but not for the entire area. (Author)

AD-274 775 Div. 2
(TISTP/FR) OTS price $8.60

Wisconsin U., Madison.
GROSSWETTER TYPES AND DEPARTURES FROM THE MEAN FLOW AS STRATIFICATION PARAMETERS FOR THE 500 mb EUROPEAN GEOSTROPHIC WIND FIELD,
by James F. Lahey. Dec 61, 84p. incl. illus. tables, 8 refs. (Scientific rept. no. 8)
(Contract AF 19(604)5191)
(AFCRL TN 61-1004) Unclassified report

DESCRIPTORS: (Europe, High altitude, *Wind, Statistical analysis.) (Climate, Classification.)

The efficacy of the Grosswetter classification in forecasting the wintertime u and v components of the 500 mb wind at 55 N, 40 E is evaluated. This classification is found to be generally superior to seasonal climatology. Daily deviations from the monthly 500 mb resultant flow at 55 N, 40 E are organized into nine classes. The percentage frequency of these nine classes within each Grosswetter type is shown and the feasibility of probability forecasts based on these percentages is suggested. The nine wind classes at 55 N, 40 E are then used to discern the 500 mb wind flow characteristics of the Wz Grosswetter type over western Europe which are related to the u and v components at 55 N, 40 E. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

No Entries

4. CHEMISTRY

AD-274 467 Div. 4, 25
(TISTM/TCG) OTS price $2.60

Cornell U. Graduate School of Aeronautical Engineering, Ithaca, N. Y.
MECHANISMS FOR VIBRATIONAL RELAXATION AT HIGH TEMPERATURES.
Technical rept.,
by S. H. Bauer and S. C. Tsang. Apr 62, 18p. illus. 18 refs. (Rept. no. CU-7356)
(Contract AF 49(638)716)
Unclassified report

DESCRIPTORS: (*Reaction kinetics, *Dissociation, *Recombination reactions, *Gases, Ions, Molecules during *Ionization, Molecular rotation, Vibration, Relaxation time at High temperature research, Energy transfer, Excitation, Atomic energy levels, Theory.) Shock waves, Atmosphere entry.

Attention is called to several mechanisms which effectively couple translational and vibrational motions through the intermediary of chemical reactions. It was proposed that these processes lead to shorter relaxation times than those expected from direct energy exchange via inelastic collisions. Semiquantitative estimates were made, and relaxation times for these different processes were compared as a function of the reciprocal temperatures. At high temperatures, it was proposed that the transfer of energy from rotations to vibrations at approximately constant total energy could be induced by distant collisions. These serve only to balance the change in rotational angular momentum. Such events provide alternate paths for rapid vibrational relaxation, particularly for the upper vibrational levels, and may account for the discrepancy between the observed and calculated rates of dissociation. (Author)

AD-274 489 Div. 4, 14
(TISTM/GEC) OTS price $1.60

Midwest Research Inst., Kansas City, Mo.
SYNTHESIS OF ELASTOMERS CONTAINING Si-N BONDS IN THE MAIN CHAIN.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 62, by L. W. Breed and R. L. Elliott. 31 Mar 62, 13p. incl. tables.
(Contract DA 23-072-ORD-1687)
Unclassified report

DESCRIPTORS: (*Heat resistant polymers, *Elastomers, *Silicon compounds, *Nitrogen compounds, Synthesis.) (Polymers, Chlorine compounds, Methyl radicals, Phenyl radicals, Silanes, Azo radicals, Cyclopentanes, Cyclohexanes, Propyl radicals, Amines.) (Polymerization, Molecular structure, Viscosity, Molecular weight.) Infrared spectroscopy, Chemical analysis.

The preparation of several new ethylene-bridged trisilazane monomers and intermediates is reported. Additional examination of the polymerization of these monomers and monomers described in earlier reports has not revealed a method for preparing polymeric materials with intrinsic viscosities greater than about 0.2. Unsuccessful attempts were made to increase the degree of polymerization by modification of the polymerization temperature, solvent, and catalyst. The effect of purity of the chlorosilanes used in the monomer synthesis was also studied; and the presence of small quantities of chlorotrimethylsilane was not a significant factor in limiting the polymer mol-wt. (Author)

AD-274 499 Div. 4
(TISTM/GEC) OTS price $1.75

New York U., N. Y.
RESEARCH ON ORGANOALUMINUM COMPOUNDS.
Final rept., for 1 Apr 58-31 Mar 61 on Research on Combustion Kinetics,
by Karl Weiss and Charles J. Marsel. Dec 61, 58p. incl. illus. tables, 54 refs.
(Contract AF 33(616)5610, Proj. 7013)
(ARL-124) Unclassified report

DESCRIPTORS: (*Metalorganic compounds, *Aluminum compounds, *Ethyl radicals, Synthesis, Chemical reactions, Oxidation, Displace-

ment reactions, Chemical bonds.) (Hydrides, Nitrogen compounds, Azides, Phenyl radicals, Chlorides.) (Theory, Molecular structure, Infrared spectroscopy, Calorimeters, Thermodynamics.)

The synthesis and reactions of a variety of organic Al compounds were investigated. The reactions of primary, secondary, and tertiary amines with $(C_2H_5)_3Al$ and $(C_2H_5)_2AlH$ were studied, and the thermolysis of several of the resulting Al-N, compounds was examined. $(C_2H_5)_2AlN_3$ and $(C_2H_5)_2Al(C_6H_5)$ were prepared from $(C_2H_5)_2AlCl$ and the corresponding metal salts. Attempts to obtain di-al compounds and cyclic Al compounds from ethylaluminum chlorides and bifunctional metal alkyls produced $(C_2H_5)_3Al$ and Al-containing polymers. The same products were obtained in the attempted preparation of di-al compounds from alkynes and $(C_2H_5)_2AlH$. Al-C bond containing products were obtained from the reactions of terminal dihaloalkanes with Al, and with Al-Mg alloy. Carbene (CH_2*) was not produced in the reaction of CH_2I_2 with Al. Al alkyls and related organoaluminum compounds were readily oxidized by cobaltous chloride and some other metal halides. The products of these reactions were alkanes, alkenes, Al halides, and metal from the oxidizing agent. A precision, quasi-adiabatic calorimeter was constructed for the measurement of the heats of coordination or organoaluminum compounds with electron donors. Al aryls required for these determinations were prepared by modified classical procedures. (Author)

AD-274 520 Div. 4, 14
(TISTM/GEC) OTS price $3.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
SOME INVESTIGATIONS INTO THE CHEMISTRY OF SILICON-NITROGEN POLYMERS.
Technical rept.,
by James M. Maselli. 31 Mar 62, 31p. incl. tables, 20 refs.
(Contracts Nonr-186613 and SD-88)
Unclassified report

DESCRIPTORS: (*Polymers, *Elastomers, *Silicon compounds, *Nitrogen compounds, *Amines, Azo radicals, Synthesis, *Polymerization, Chemical reactions.) (Stability, Temperature, Hydrolysis.) (Methyl radicals, Silicones, Heterocyclic compounds, Ethyl radicals, Phenyl radicals, Oxygen compounds, Vinyl radicals, Chlorides.)

The preparation and characterization of polysilylamine and polysilazane polymers continued. The objectives of the investigation were: to incorporate a cyclic diamine into the Si-N polymer backbone, to polymerize hexamethylcyclotrisilazane, to study silylhydrazine polymers, to prepare siloxydiamines suitable for polymerization, and to seek a new method for the synthesis of silylamines and silazanes. Several new polymers were synthesized and their methods of preparation and their characteristics are presented. (Author)

AD-274 539 Div. 4, 20
(TISTM/EJH) OTS price $2.60

Chicago U., Ill.
RADIOLYSIS OF LIQUID METHANOL - INHIBITORY EFFECTS OF ADDITIVES.
Rept. on Solid State Research and Properties of Matter,
by Weldon G. Brown and Manfred K. Eberhardt.
Nov 61, 17p. incl. illus. tables.
(Contract AF 33(616)3875, Proj. 7021)
(ARL-90) Unclassified report

DESCRIPTORS: (Solutions, *Methanol, Water, Radiation effects, Gamma rays, Inhibition, Chemical reactions, Production, Ethylenes, Glycols, Nitrogen compounds, Oxides, Additives, Benzenes.)

Experiments were performed on the gamma irradiation of liquid methanol in sealed glass bulbs containing quantities of NO up to 0.25 millimoles per gram methanol. (Author)

AD-274 547 Div. 4, 25
(TISTM/EJH) OTS price $2.60

Gibbs Chemical Lab., Harvard U., Cambridge, Mass.
THE IONIZATION ACCOMPANYING THE ACETYLENE-OXYGEN REACTION IN SHOCK WAVES,
by Clifford W. Hand and G. B. Kistiakowsky.
15 Mar 62, 15 p.illus. 23 refs.
(Contract Nonr-186636)
Unclassified report

DESCRIPTORS: (Shock waves, *Gas ionization, Plasma physics, *Reaction kinetics, Photoemission, Luminescence, Ultraviolet radiation, Chemical reactions, *Acetylene with *Oxygen, Mixtures with Argon, Additives, Acetones, Methyl radicals, Lead compounds.) (Oxidation, Ionization, Test methods.)

A Langmuir probe was used to study the ionization produced during the oxidation of acetylene in shock waves. (Author)

AD-274 602 Div. 4
(TISTP/MFA) OTS price $1.60

RIAS, Inc., Baltimore, Md.
THE EFFECT OF SUBSTITUTION ON THE IONIZATION POTENTIALS OF FREE RADICALS AND MOLECULES. III. ESTIMATION OF THE IONIZATION POTENTIALS OF CYCLOALKYL RADICALS AND CYCLIC AMINES BY δ_K VALUES. IV. δ_K VALUES FOR ALCOHOLS, ETHERS, THIOLS AND SULFIDES,
by Joyce J. Kaufman. Mar 62, 15p. 10 refs.
(Technical rept. no. 3)
(Contract Nonr-347100)
Unclassified report

DESCRIPTORS: (*Ionization potentials, *Free radicals and *Molecules, Alcohols, Amines, Ethers, Thiols, Sulfides.) (Ionization, Measurement.)

From measured photoionization potentials of amines, a new set of constants which quantitatively reflect changes in ionization potential with substituent groups were derived. Using these, ionization potentials of alkyl free radicals could be estimated to within the experimental error of their measurements. There is a saturation effect and these values are not linearly additive but can be combined following certain set precepts. Values obtained from linear and branched alkyl substituents proved to be extendable to cyclic substituents in which the carbon from whence the unpaired electron was being withdrawn was itself part of the ring. However, effects of substitution on ionization potentials are not the same for the series of alcohols and ethers as for the amines. (Author)

AD-274 603 Div. 4, 25
(TISTM/GEC) OTS price $3.60

RIAS, Inc., Baltimore, Md.
APPEARANCE AND IONIZATION POTENTIALS OF SELECTED FRAGMENTS FROM DECABORANE $B_{10}H_{14}$,
by Joyce J. Kaufman, W. S. Koski and others.

19 Mar 62, 38p. incl. illus. tables, 17 refs.
(Technical rept. no. 2)
(Contract Nonr-347100)

Unclassified report

DESCRIPTORS: (Ions, *Decaboranes, Boron compounds, Chemical bonds, Isotopes, *Ionization potential, Measurement, Mass spectroscopy.)

The appearance potentials of selected ions from decaborane B10H14 (99.68% B11) were measured mass spectroscopically. A set of apparently self-consistent ionization potentials for decaborane and various B10Hn fragments were calculated from these appearance potentials, using what little thermochemical bond energy data are available, combined with the authors' interpretation of the processes taking place on ionization and fragmentation. A computer program to calculate monoisotopic fragmentation patterns from mass spectral raw data was written. From the mass spectrum of B10H14 at 70 ev the monoisotopic fragmentation pattern of decaborane was calculated. For comparison, from mass spectral raw data at 70 ev of decaborane containing normal isotopic abundances of B10 and B11, several different monoisotopic fragmentation patterns of decaborane were calculated which varied depending upon the method of choice of the original percentage B10 in the molecule. (Author)

AD-274 636 Div. 4, 17
(TISTM/BRW) OTS price $.50

Watertown Arsenal Labs., Mass.
AN ION EXCHANGE-PHOTOMETRIC METHOD FOR THE DETERMINATION OF URANIUM IN STEEL,
by Thomas A. Ferraro and Walter F. Czyrklis.
Mar 62, 17p. incl. illus. tables, 30 refs.
(Rept. no. WAL TR 823/3)
(DA Proj. no. 593-32-008)

Unclassified report

DESCRIPTORS: (Chemical analysis by Ion exchange and Photometers for Determination of *Uranium in *Steel.) Test methods, Nitric acid, Separation.)

An ion-exchange separation scheme was developed for the determination of uranium in steel. Anion exchange from a nitric acid solution is employed. Uranium is determined by the basic peroxide photometric method after its separation. A detailed procedure and data supporting the method are given. (Author)

AD-274 637 Div. 4, 17
(TISTM/BRW) OTS price $.50

Watertown Arsenal Labs., Mass.
APPLICATIONS OF A SPECTROGRAPHIC-SOLUTION TECHNIQUE TO ANALYSIS OF IRON, TITANIUM, VANADIUM, AND ZIRCONIUM ALLOYS,
by Fred G. Howell and William K. Murray. Mar 62, 18p. incl. tables, 6 refs. (Rept. no. WAL TR 823.5/1)
(DA Proj. no. 593-32-007)

Unclassified report

DESCRIPTORS: (Alloys, *Metals, Iron alloys, Titanium alloys, Vanadium alloys, Zirconium alloys, Solutions, *Spectrographic analysis, Test methods.)

A spectrographic-solution technique was applied to the analysis of certain iron, titanium, vanadium and zirconium alloys. The samples, after dissolution in an appropriate acid, are excited with a high-voltage spark using a commercial rotating-disk unit. Suitable line pairs are selected and calibration curves drawn using synthetic alloy solutions prepared from pure metals. The coefficient of variation for analysis of representative samples of each of the above alloy systems was determined. (Author)

AD-274 661 Div. 4
(TISTM/EJH) OTS price $1.10

Illinois U., Urbana.
STUDY LEADING TO THE DEVELOPMENT OF POLYMERS FOR USE IN HIGH TEMPERATURE.
Quarterly progress rept. no. 11, 1 Dec 61-28 Feb 62,
by Therald Moeller and Antonio Vandi. 28 Feb 62, 7p. 9 refs.
(Contract DA 11-022-ORD-2956)

Unclassified report

DESCRIPTORS: (*Heat resistant polymers, Sulfanuric *Sulfonyl radicals, *Chlorides, Synthesis by Decomposition, Pyrolysis, Chlorine compounds, Phosphorus compounds, Azo radicals, Sulfonyl radicals, Chlorides, Isomer, Heterocyclic compounds.) (Chemical reactions, Thionyl Chlorides with Ammonium radicals, Chlorides, Sulfamyl radicals, Amines.)

The preparation of trimeric sulfanuric chloride by the thermal decomposition of trichlorophosphazosulfonyl chloride was accomplished. Experiments indicated that the cleavage proceeds in a quantitative way but only two isomeric forms were obtained in low yields. This suggests the possibility that the residue may contain some other isomers, such as the tetramer or higher linear polymers. Attempts to prepare sulfanuric chloride by the reaction of SOC12 with NH4C1 in symtetrachloroethane as a solvent and in the presence of C1 as an oxidizing agent failed to give positive results. Although the reaction was carried out under different conditions of time and temperature, NH4C1 was recovered always in stoichiometrical quantities. (Author)

AD-274 690 Div. 4
(TISTM/GEC) OTS price $2.60

United Technology Corp., Sunnyvale, Calif.
THERMOCHEMISTRY OF OXYGEN-FLUORINE BONDING.
Quarterly technical summary rept. no. 4 and Annual Summary rept., 1 Mar 61-28 Feb 62,
by R. Anderson. 28 Feb 62, 26p. incl. illus. tables, 11 refs. (Rept. no. UTC 2002-QT4)
(Contract Nonr-343300)

Unclassified report

DESCRIPTORS: (*Oxygen, *Fluorine, *Chemical bonds, Thermochemistry.) (Nitrogen compounds, *Oxyfluorides, Fluorides, Chlorine compounds, Nitrates.) (Synthesis, Heat of formation, Heat of reaction, Chemical analysis, Infrared spectroscopy, Fractionation.) (Design of Combustion, Calorimeters.)

Study continued on the thermochemical data required to derive O-F bond energies for NO3F and C104F and establish the thermochemical properties of NO2F. Various oxygen fluorides, sulfur fluoride compounds, and fluorocarbon derivatives with O-F bond groupings were studied. The bond energies which were derived for O-F compounds show wide variations depending on the relatively arbitrary assignment of energies to the other bonds of the molecules. (Author)

AD-274 797 Div. 4
(TISTM/GEC) OTS price $2.60

California U., Berkeley.
HYDROGEN ABSTRACTION FROM HYDROCARBONS BY METHYL RADICALS FROM THE PHOTOLYSIS OF METHYL IODIDE IN SOLID NITROGEN,
by C. David Bass and George C. Pimentel.
31 Mar 61, 21p. incl. tables.
(Contract AF 49(638)1)
(AFOSR-1067) Unclassified report

DESCRIPTORS: (Photochemistry, Photochemical reactions, Reaction kinetics, *Photolysis of Hydrocarbons and Deuterated compounds containing *Methyl radicals, *Ethyl radicals, *Iodides, Low temperature research.) (Photons, Absorption and *Hydrogen abstraction, Energy dissipation.) (Solids, Nitrogen, Krypton, Xenon.) Infrared spectroscopy.

CH3I was photolyzed at 20 K in solid matrix materials, N2, Kr, and Xe, containing hydrocarbons (C2H6 or (CH3)3CH) or deuterated hydrocarbons (CD4, CH3CD3, or (CH3)3CD). H abstraction was studied by infrared detection of CH4 and CH3D. In the solid, the abstraction products can be attributed to CH3 radicals with an effective temperature in the range 1000 - 3000 K. The products obtained from photolysis of CH3I with C2H6 present as well as those from photolysis of C2H5I in N, indicated that about 85% of the reactions probably occurred within the cage at the site of photon absorption. These studies provided information concerning the dissipation of the energy of a hot radical constrained within a reactive cage. (Author)

AD-274 830 Div. 4
(TISTM/EJH) OTS price $8.10

Olin Mathieson Chemical Corp., New Haven, Conn.
BORON POLYMERS.
Annual rept. no. 1, 1 Mar 61-28 Feb 62,
by T. L. Heying and H. A. Schroeder. 28 Feb 62,
74p. incl. illus. tables (Technical rept. no. 6)
(Contract Nonr-339500)
Unclassified report

DESCRIPTORS: (*Heat resistant polymers, *Polymers, Metalorganic compounds, *Boron compounds, *Phosphorus compounds, Organoboranes, Borines, Pentaboranes, Decaboranes, Phosphinoborines, Chemical reactions, Synthesis.) (Phenyl radicals, Phosphines, Decaboranes.) (Pyrolysis, Chemical analysis, Infrared spectroscopy.)

Contents:
Borine Derivatives
Reactions of Pentaborane-9
The Perhydrodecaborate Series of Compounds
Decaborane, Its Derivatives and Their Chemistry
Unsymmetrical B10H12 Compounds
Symmetrical B10H12 Compounds
Preparation and Chemistry of Phosphorus Substituted B10H14 Derivatives
Reactions of 2-Substituted Decaboranes
B10H12 Polymers from Their Monomers
B10H12 Polymers by Direct Methods
Pyrolysis of Decaborane Derivatives

5. COMMUNICATIONS

AD-274 466 Div. 5, 25, 8
(TISTE/CAM) OTS price $3.60

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
STUDY OF A SPEECH COMPRESSION SYSTEM (SPECTRUM SELECTION).
Quarterly technical rept. no. 8, 15 Sep-15 Dec 61,
by Jay H. Ball, Joseph Colaruotolo, and Karl D. Kryter. 30 Jan 62, 33p. incl. illus.
(Contract DA 36-039-sc-78078)
Unclassified report

DESCRIPTORS: (*Voice communication systems, *Digital systems, Data storage systems, *Speech transmission, Coding, Intelligibility, Audiofrequency, Sidebands, Design, Tests.) (Transistor amplifiers, Band-selective amplifiers, Band-pass amplifiers, Band-pass filters, Acoustic filters, Timing circuits.) (Pulse generators, *Pulse modulation, Pulse transmitters, Crystal oscillators, *Data processing systems, *Analog-to-digital converters.)

AD-274 545 Div. 5, 30
(TISTE/CDM) OTS price $11.50

Minneapolis-Honeywell Regulator Co., Seattle, Wash.
DEVELOPMENT OF A STANDARD COMMUNICATION RATING SYSTEM,
by D. L. Scidmore and M. G. Oelrich. 5 Jan 62, 144p. incl. illus. refs. (Rept. no. 872)
(Contract AF 30(602)2390, Proj. 4519)
(RADC TDR 62-70) Unclassified report

DESCRIPTORS: (*Communication systems, Tests, *Standards, Design, Theory, Test methods.) (*Wave transmission, Radio waves, Scattering by Ionosphere, Atmosphere and Meteors, Very low frequency, Ionospheric propagation, Transmission lines, Radiofrequency cables, Satellite vehicles, Radio transmission, Microwave relay systems, Radio relay systems.) (*Radio communicationysystems, *Microwave communication systems, Communication equipment, Costs, Mathematical analysis, Specifications.) Reliability.

Efforts were devoted toward developing a standard rating system useful for comparison and evaluation of communication systems. Such a rating system model was formulated; and the mathematical development supporting the feasibility is given. The logical steps of establishing requirements, philosophy, and model framework for a rating system are developed and supported on a theoretical bases. Propagation modes used are examined to determine that they fit within the mathematical requirements. Finally a means of processing and presenting the ratings for comparison and evaluation is devised. The rating system evolved has few limitations, is quite flexible and easily used, and is applicable to a wide range of point-to-point communication problems. (Author)

AD-274 597 Div. 5, 15
(TISTP/MFA) OTS price $2.60

RAND Corp., Santa Monica, Calif.
EXPECTED CRITICAL PATH LENGTHS IN PERT NETWORKS,
by D. R. Fulkerson. Mar 62, 19p. incl. illus. table, 4 refs. (Memo. no. RM-3075-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (Communication systems, Analysis, Probability, *Combinatorial analysis, *Complex variables, *Scheduling, *Management engineering.)

A feasible computational method that seems to yield a fairly good approximation to the expected duration time of a project whose individual job times are random variables is described. Another possible area of application of this method would be to communication networks whose components are subject to random delay times. (Author)

Division 6-DETECTION

AD-274 660 Div. 5, 30, 8
(TISTE/CAM) OTS price $3.60

International Business Machines Corp., Rockville, Md.
IMPROVED PHASE MODULATOR-DEMODULATOR.
Quarterly progress rept. no. 3, 1 Dec 61-28 Feb 62,
by John G. Puente. 28 Feb 62, 39p. incl. illus.
(Contract DA 36-039-sc-87248)
Unclassified report

DESCRIPTORS: (*Voice communication systems, Phase modulation, Modulators, Detectors, Model tests, Design.) (Communication systems, Telephone lines, Telephone communication systems, Digital systems, Data transmission systems, Data processing systems, Computer logic, Coding.) (Electronic circuits, Switching circuits, Timing circuits, Pulse transmitters, Pulse integrators.)

Progress was made in the design of a modulator-demodulator. The technique to obtain character sync is presented. It is a basic 9 bit character, 8 bits data, 1 bit sync. A listing of all special circuits and their relative completeness is included. (Author)

AD-274 735 Div. 5, 8
(TISTP/FR) OTS price $17.00

Jansky and Bailey Div., Atlantic Research Corp., Wheaton, Md.
A STUDY OF HIGH FREQUENCY COMMUNICATIONS IMPROVEMENT TO OVERCOME THE IMPACT OF MINIMUM SOLAR ACTIVITY.
Interim rept.,
by Leon H. King and David S. Anderson. Mar 62, 260p. incl. illus. tables, 15 refs.
(Contract SD-98)
Unclassified report

DESCRIPTORS: (Military operations, *Radio communication systems, High frequency, Propagation, *Sunspots, *Ionospheric disturbances, Noise (Radio), Statistical analysis.)

The impact of the solar cycle minimum on selected high frequency communication trunks of the Defense Communications Systems for assumed running average sunspot numbers of 100, 50, and 5 is studied. The impact is defined as the percentage of time when none of the assigned frequencies will provide communications on the trunk in question within the limits imposed by the combined effects of propagation conditions, noise levels, and system parameters. Impact determination for a specific trunk was principally a problem in propagation, although the characteristics of system equipments also were considered. (Author)

AD-274 826 Div. 5, 12
(TISTE/CDM) OTS price $5.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOME ASPECTS OF SPACE COMMUNICATION,
ed. by D. G. Brennan. 21 Mar 62, 55p. incl. illus.
(Contract NASw-161)
Unclassified report

DESCRIPTORS: (*Communication systems for *Space flight.) (Ultra high frequency, *Radio waves, *Wave transmission, Ionospheric propagation, Ionization from Solar flares, Multipath transmission, Attenuation.) (*Radio signals from Telemetering transmitters on Lunar probes, Space probes, Propagation, Tests, Measurement.) (*Communications theory, Radio interference, *Noise (Radio), Radio signals, Errors, Mathematical analysis.) (Phase detectors, *Phase measurement, Signal-to-noise ratio.) (Reduction of *Radio interference due to Solar noise.)

Contents:
Physics of the propagation medium, by J. C. James
Propagation effects, by D. G. Brennan
Channel measurements on telemetry transmissions, by Joel Max
Signal sets with uniform correlation properties, by Joel Max
Phase and frequency estimates, by Joel Max
Interference reduction by T. F. Rogers

AD-274 840 Div. 5, 8
(TISTE/NTM) OTS price $7.60

RCA Defense Electronic Products, New York.
AN ORDER-WIRE FOR PCM SYSTEMS.
Final rept., Task IIA on Microwave Radio Relay Systems Study,
by R. Gardner and J. Rabinowitz. 28 Feb 62, 72p. incl. illus. 3 refs. (Rept. no. CR-62-419-2)
(Contract DA 36-039-sc-87240)
Unclassified report

DESCRIPTORS: (*Pulse modulation, *Coding, *Radio relay systems, *Microwave relay systems, *Radio communication systems.) (*Amplitude modulation, *Multiplex transmission, Noise (Radio), Sources, Signal-to-noise ratio, Radiofrequency, Errors, Distortion, Attenuation, Detectors, Audiofrequency, Modulation.)

An experimental study of an amplitude modulated PCM order wire is described. Using a simulated 12-channel PCM pulse train and an AN/GRC-50 transmitter and receiver, the following results were observed for 30% AM. In an order wire band, 300-2400 c, the signal-to-noise ratio for high RF signal levels was: 33.0 db for full band, normal rate trains, and 28.0 db for full band, double rate (biternary) trains. At an error rate of 10 to the -6th power, a 1.5 db increase in RF signal power is required to compensate for the effects of 35% AM. Receiver noise in the order wire is 33 db below signal level using 30% AM, and operating at a PCM error rate of 10 to the -6th power. Several methods for detecting the AM order wire were tried. The best of these consists in subtracting from the AM-PCM train a delayed replica of the train and then applying half wave envelope detection to both positive and negative envelopes, using the average of the detected voltages for the order wire output. Theoretical analysis is given for the order wire noise caused by low frequency cutoff, intersymbol interference, and noise due to missing pulses. Theoretical and experimental results agree closely.

6. DETECTION

AD-274 468 Div. 6
(TISTW/RD) OTS price $3.60

Florence U. (Italy).
THE VOLUME DENSITY OF RADAR ECHOES FROM METEOR TRAILS, IN THE CASE OF UNIFORM DISTRIBUTION OF

THE HELIOCENTRIC RADIANTS,
by Nello Carrara, Pier Francesco Checcacci and others. July 61, 34p. incl. illus. (Technical note no. 2)
(Contract AF 61(052)477)
(AFCRL-952) Unclassified report

DESCRIPTORS: (Density of *Radar reflections, *Radar echo areas from *Meteors.) Italy.

General formulas are derived, which express the volume density of the reflection points of the meteor trails, as well as the volume density of the echoes revealed by a radar, in terms of the heliocentric velocity distribution. Then, as an application, the volume density of the reflection points is evaluated, in the case of uniform distribution of heliocentric radiants. The expression of the volume density of the radar echoes is presented. (Author)

AD-274 500 Div. 6
(TISTW/RD) OTS price $2.60

Naval Ordnance Lab., White Oak, Md.
A SIMPLE PREDICTION METHOD FOR THE SIGNAL DETECTABILITY OF ACOUSTIC SYSTEMS,
by R. J. Urick and P. L. Stocklin. Feb 62, 18p. incl. illus. tables, 15 refs. (NOLTR 61-164)
Unclassified report

DESCRIPTORS: (Mathematical prediction for *Detection of *Sonar signals, Signal-to-noise ratio, Underwater sound signal.) (*Sonar, Sonar equipment, Sonar receivers, Design.) (Underwater sound, Underwater sound transmission, *Underwater sound signal, Detection.)

A method is given for predicting the signal-to-noise ratio to be expected for some simple receiving systems. The method relies heavily on the work of Peterson, Birdsall and Fox, and requires, as a starting point, a specification of detection and false-alarm probabilities as performance criteria. Some sonar examples are indicated, and the validity of the method is demonstrated by comparison with measured recognition differentials for the ear, and with measured detection thresholds for A-scan radar displays. For sinusoidal signals in Gaussian noise, the min achievable signal-to-noise ratio is shown to be d/2T sub s, where d is determined by the selected probabilities and T sub s is the observation time. This min threshold deteriorates whenever the system requirements impose a deterioration of knowledge of the signal. It is clear that in general the only valid approach to improving the detection threshold is to improve the available knowledge concerning the signal and noise. (Author)

AD-274 540 Div. 6, 8, 1, 12, 30
(TISTE/NTM) OTS price $2.60

Army Signal Missile Support Agency, White Sands, Missile Range, N. Mex.
UNITED ELECTRODYNAMICS, INC. MODEL TR-10 FM TELEMETRY TRANSMITTER (WITH FILTER) SPECTRUM UTILIZATION CHARACTERISTICS,
by Virgilio Cisneros. 27 Mar 62, 17p. incl. illus. tables (AFC rept. no. TM-27-3-62-T)
Unclassified report

DESCRIPTORS: (*Telemetering transmitters with Radiofrequency filters, Frequency modulation, Radiofrequency power, *Radio interference, *Radiofrequency spectrum analyzers, Reliability, Tests.) (Telemetering antennas, Transmission lines, Interference.) (Telemeter systems, Communication equipment, Aircraft equipment, Guided missiles, Test facilities, Instrumentation.)

The spectrum utilization characteristics of the UED Telemetry Transmitter Model TR-10 w/Ark Electronics RF Filter, Model TM-2S and UED Power Line Filter (no model no.), were determined to facilitate the assignment of frequency on an interference-free basis. Operational characteristics such as frequency stability, power output and modulation characteristics were empirically examined against the parameters of operating time and supply voltage variations. Interference characteristics (spurious emanations) antenna conducted, radiated and power line conducted, were also examined. It is recommended that the UED Telemetry Transmitter w/Ark Electronics RF Filter Model TM-2S and UED Power Line Filter be authorized for operational use at White Sands Missile Range. (Author)

AD-274 669 Div. 6, 8, 2
(TISTP/FR) OTS price $3.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
RADIO-ECHO OBSERVATIONS OF THE MOON AT 3.6-CM WAVELENGTH,
by J. V. Evans. 19 Feb 62, 38p. incl. illus. tables, 24 refs. (Technical rept. no. 256)
(Contract AF 19(604)7400)
(AFESD TDR 62-77)
Unclassified report

DESCRIPTORS: (*Moon, Terrain, *Radar analysis.) (Radar echo areas, Radar reflections.) (Radar equipment, Integrators.)

Radio-echo studies of the lunar surface in the wavelength range 3 meters to 10 cm indicate that the surface is smooth and undulating for the most part, with an average surface gradient of the order of one in ten. Photometric studies of the brightness distribution over the moon's disk, on the other hand, demonstrate the existence of microstructure which causes the surface to appear very rough at these much shorter wavelengths. This report describes radio-echo measurements of the reflection properties of the moon at a wavelength of 3.6 cm. The results show that the surface appears a good deal rougher at 3.6 cm than at meter wavelengths. Some 30 per cent of the reflected power is returned from scatterers that are uniformly distributed over the surface. The remainder is reflected from a region at the center of the visible disk which has a radius of about half the lunar radius. In this region, the surface appears to be describable by means of a Gaussian spatial autocorrelation function with a mean surface gradient of one in three. (Author)

AD-274 708 Div. 6, 8
(TISTW/DLW) OTS price $1.60

Army Air Defense Board, Fort Bliss, Tex.
EVALUATION OF CROW-CRACK PROCEDURES.
21 Feb 62, 12p. incl. illus. (Proj. no. TF-1161)
Unclassified report

DESCRIPTORS: (Radar beacons, *Radar receivers, Airborne using Radar signals from Radar tracking, *Command systems as Control systems for Radar jamming, Radar transmitters during Tests of Antiaircraft defense systems.) (Feasibility studies of using Radar receivers, Radar beacons from Guided missiles, Surface to air, Command systems in Radar jamming, Aircraft.)

Tests were conducted to evaluate Crow-Crack procedures, specifically using the Nike Ajax

transponder (guidance unit) mounted in a Strategic Air Command aircraft. During weapons system evaluation tests in March 1958, it was found that an ECM-emitting aircraft would reinforce other emitters or screen quiet aircraft when it is very close to the defended area. These aircraft were theoretically destroyed, but they continued aiding other threats to the defended area. This caused the Air Force and the Army to come to unrealistic conclusions. It was determined, therefore, that a method was needed to notify the aircraft, after being theoretically destroyed, to turn off its ECM equipment. (Author)

AD-274 795 Div. 6, 25
(TISTW/DLW) OTS price $3.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
FURTHER STUDIES OF THE RADAR CROSS SECTION OF PLASMA CLAD BODIES,
by L. Peters, W. G. Swarner and D. T. Thomas.
15 Mar 62, 25p. incl. illus., 8 refs. (Rept. no. 1116-19; Scientific rept. no. 12)
(Contract AF 19(604)7270)
(AFCRL 62-183) Unclassified report

DESCRIPTORS: (*Plasma physics, *Spheres, Dielectric properties, Electromagnetic waves, Scattering, Electromagnetic wave reflections, *Radar echo areas, Electromagnetic theory, Mathematical prediction.)

Approximate methods based on the pertinent scattering mechanisms are given for determining the radar cross sections of plasma clad bodies. A superposition principle is used combining the scattered fields from the sheath alone and from a modified metallic body. Appropriate modifications of the scattered fields of the modified metallic body are discussed with respect to the physical phenomena involved. Approximate radar cross sections of spherical bodies clad in concentric spherical sheaths are compared with the exact multipole expansion solutions giving excellent agreement for all sizes and dielectric constants except for small restricted regions. An approximate method based on macroscopic properties is given for determining the radar cross section of dielectric bodies. This method is superior in accuracy, simplicity, and range of validity to previous methods. (Author)

7. ELECTRICAL EQUIPMENT

AD-274 497 Div. 7, 8
(TISTE/NTM) OTS price $4.60

Ordnance Research Lab., Pennsylvania State U., University Park.
A HIGH-FREQUENCY APPLICATION OF THE SILICON-CONTROLLED RECTIFIER,
by Floyd H. Reeser. 15 Feb 62, 39p. incl. illus. tables, 10 refs. (Serial no. 82)
(Contract NOrd-16597)
Unclassified report

DESCRIPTORS: (*Rectifiers, *Inverted rectifiers, Silicon, Semiconductors, Electric trigger controls, *Inverter circuits, *Switching circuits, Trigger circuits, Triggered gates, Pulse generators, Relaxation oscillators, Oscillator circuits, Design, Theory.) (Transformers, Inductance, Magnetic cores, Mathematical analysis.)

An inverter utilizing the silicon-controlled rectifier, capable of generating high power at high frequency, is described. A brief theoretical summary of the operation of the device is included, followed by an analysis of the inverter. Design procedures and graphs are developed that make possible the design of such an inverter based upon design criteria. An experimental model for operation at 15 kc was designed and tested. Results indicated that approximately 500 w of power can be obtained with this particular model. (Author)

AD-274 614 Div. 7
(TISTM/GEC) OTS price $1.10

New York State Coll. of Ceramics, Alfred U.
HYDROGEN-OXYGEN ELECTRODE STUDY IN HYDROX FUEL CELLS.
Quarterly technical progress rept. no. 1,
by T. J. Gray and W. A. Bridgeo. 15 Mar 62, 9p. incl. illus.
(Contract AF 33(657)7564)
Unclassified report

DESCRIPTORS: (Power supplies, *Fuel cells, Electrolytic cells, Design, *Hydrogen, *Oxygen Theory, *Electrodes, Graphite, Test methods.)

Study has centered on a standardization technique to provide reproducible electrodes of accurately known characteristics. Although graphite was selected as a suitable starting point, C, porous metal and composite electrodes will be included. Electrodes were examined before and after use by surface area measurements, optical and electron microscopy and by spectrographic analysis. This work will give the degree of reproducibility necessary to ensure the validity of detailed measurements of electrode performance. (Author)

AD-274 841 Div. 7
(TISTP/TL) OTS price $2.25

RCA Defense Electronic Products, Princeton, N. J.
SOLAR CELL ARRAY OPTIMIZATION, VOLUME II.
Progress rept. no. 2, Mar-Oct 61 on Research and Development Program Involving Solar Cell Array Optimization.
Feb 62, 78p. incl. illus. tables, 9 refs.
(Contract AF 33(616)7415, Proj. 3145)
(ASD TR 61-11, Vol. 2) Unclassified report

DESCRIPTORS: (*Solar cells, Photoelectric cells, Thin films, Materials, Radiation damage.) (Single crystals, Cadmium compounds, Sulfides, Reliability, Adhesives, Coatings, Airborne, Plastics.) (*Electric power production, Power supplies.)

The analysis covers the fabrication and test of photovoltaic materials and design of solar-cell arrays for maximum conversion of solar energy with minimum weight. Evaporated layer cells with an efficiency of up to 4.5 percent over an area of 1.6 sq cm were fabricated. Research on crystal layer conversion reduced the temperature for recrystallization from 500 C to 300 C. Two models of solar-cell arrays to simulate a 100 sq ft system were fabricated: the telescoping sail with a density of 0.075 lb sq ft., and the inflatable torus sail with a density of 0.04 lb sq ft. The maximum area of individual cells was increased by a factor of 27, thickness of substrate reduced by factor of 6, and weight reduced by factor of 7.

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-274 469 Div. 8, 19
(TISTE/CDM) OTS price $5.60

DECO Electronics, Inc., Leesburg, Va.
FORESTPORT ANTENNA STUDY.
Technical rept.,
by Fred C. Clarke. 31 Jan 62, 47p. incl. illus. tables (Rept. no. 42-F)
(Contract AF 30(602)2588; Proj. 5582)
(RADC TDR 62-78) Unclassified report

DESCRIPTORS: (Very low frequency, Radio transmitters, *Antennas, *Antenna masts, Model tests, Design, Feasibility studies.) (*Radio navigation, Air force equipment, *Radio towers, New York, Antenna radiation patterns, Radiofrequency power, Measurement, Tests.)

Feasibility study was made of the USAF Forestport, N. Y., VLF navigation antenna to increase its power radiating capability to 500 watts. Ten possible top-hat configurations were investigated by scale-model techniques. The model ranges and antennas, instrumentation, and methods of measurements are described. The results of the model study (electrical parameters and power-radiating characteristics) are presented quantitatively for each of the configurations studied. Radiated power measurements of the present full-scale Forestport antenna showed some disagreement with the model results. This was believed due to a calibration error in the antenna current measurement circuit of the Forestport antenna. The maximum antenna voltage of 109 kv was established as one of the design criteria for the increased power of 500 watts. Several of the configurations met or exceeded this power vs antenna voltage requirement. The most economical configuration is recommended. It is further recommended that additional insulation be provided to increase the safety factor of the modified antenna. (Author)

AD-274 470 Div. 8
(TISTE/CDM) OTS price $2.60

Diamond Ordnance Fuze Labs., Washington, D. C.
IMPEDANCE AND ION TRANSIT TIMES IN GLOW DISCHARGE TUBES,
by A. L. Ward and L. G. Schneekloth. 30 Mar 62, 31p. incl. illus. tables, 7 refs. (DOFL rept. no. TR-1020)
(Proj. DA-5B99-25-001)
Unclassified report

DESCRIPTORS: (*Glow discharges, *Discharge tubes, *Impedance, *Ionic current, Tests, Measurement, Mathematical analysis.) (Argon, Electron tubes, Cathodes (Electron tubes), Impedance bridges, Ions, Test equipment.)

A relationship has been noted between the transit times of ions in the glow discharge cathode fall and the frequency at which the reactance of the discharge changes from inductive to capacitive. The use of an electronic computer has enabled a more exact calculation of ion transit times. In the stationary state, effective ion transit times may be calculated directly from the field and current distributions across the gap. Dynamically, a small sinusoidal increment to the applied voltage across the tube may be used to calculate the impedance of a discharge gap. The ion transit time may then be determined from the phase lag between the electron current at the anode and ion current at the cathode. Satisfactory agreement for the ion transit times calculated by 2 methods is obtained. Experimental measurements of impedances of argon tubes have been made. Although it is difficult to obtain experimental data and calculations for the same current density range, preliminary data tend to support the proposed hypothesis relating the ion transit time and the frequency of zero reactance. (Author)

AD-274 478 Div. 8, 25, 14
(TISTE/CAM) OTS price $3.60

Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
MODULAR DESIGN OF IMPROVED SOLAR CONVERTERS.
Quarterly progress rept. no. 2, 1 Sep-30 Nov 61, by George O. Johnson, Jr. 30 Nov 61, 32p. incl. illus. tables (Rept. no. HSER 2340)
(Contract DA 36-039-sc-87461, Proj. 3A99-09-002-04)
Unclassified report

DESCRIPTORS: (*Solar cells, Materials, Design, Installation, Feasibility studies, Model tests.) (*Coatings, Epoxy resins, Silicone resins.) (Physical properties, Stabilization, Climatic factors, Vibration, Wind, Gusts, Load distribution.) (Electrical properties, Diodes, Storage batteries, Resistance, Light transmission.)

Efforts continued on the modular design of solar converters. The mechanical design was re-evaluated and improved. The number of cells in the basic module was increased to take into account cell and system losses. The number of modules for the array power levels of 50 and 100 watts were changed to 48 and 96 modules respectively to make the modules compatible with the required range of output voltage. The array base assembly was redesigned to permit array use on rough and sloping terrain up to 38 degrees and with winds up to 40 mph. Consideration was given to an equatorial mounting head to provide one axis rotation for sun tracking. A size and weight breakdown and an assembly procedure was worked out for the redesign. (Author)

AD-274 492 Div. 8, 15
(TISTP/TL) OTS price $8.10

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
DISCRETE REPRESENTATIONS OF RANDOM SIGNALS.
Doctoral thesis,
by Kenneth L. Jordan, Jr. 14 July 61, 87p. incl. illus. 65 refs. (Technical rept. no. 378)
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000)
Unclassified report

DESCRIPTORS: (*Statistical processes of Time, *Signals in a *Communications system.) (Correlation techniques of Linear systems and Nonlinear systems, Computers, Programming, Errors.) (Wave transmission, Vector analysis, Integral equations, Operators (Mathematics), Matrix algebra, Integral transforms, Sequences.) (Data transmission systems, Communications theory, Radio signals, Wave analysis.)

An investigation of the possibility of efficient, discrete representations of random signals is discussed. In many problems a conversion is necessary between a signal of continuous form and a signal of discrete form. This conversion should take place with small loss of information

but still in as efficient a manner as possible. Optimum representations are found for a finite time interval. The asymptotic behavior of the error in the stationary case is related to the spectrum of the process. Optimal solutions can also be found when the representation is made in the presence of noise. These solutions are closely connected with the theory of optimum linear systems. Some experimental results have been obtained by using these optimum representations. (Author)

AD-274 493 Div. 8
(TISTE/CRJ) OTS price $9.10

Merrimac Research and Development, Inc., Irvington, N. J.
IN-PHASE MATCHED UNEQUAL POWER SPLITTERS.
Final rept.,
by D. S. Friedman, R. Collado, and J. Rosen.
4 Dec 61, 88p. incl. illus. table (Rept. no. E-31-3)
(Contract AF 30(602)2271, Proj. 4506)
(RADC TDR 62-39) Unclassified report

DESCRIPTORS: (*Power dividers, *Waveguide couplers, *Microwave equipment, Waveguide joints, Theory, Design.) (*Waveguides, *Coaxial cables, Impedance matching, Phase measurement.) Antennas.

A new class of microwave devices, that of hybrid unequal power splitters, is investigated both theoretically and experimentally. Two basic structural types are explored in detail; these are a geometric type and a generalization of a hybrid ring. For each type, both rectangular waveguide and coaxial line models were constructed and tested. In addition, symmetric and asymmetric versions of the ring type are compared experimentally and examined theoretically. The relative advantages of each type are determined, and the asymmetric ring type is shown to be feasible and practical even with these as yet early models. (Author)

AD-274 512 Div. 8
(TISTE/NTM) OTS price $6.60

Alpha Corp., Richardson, Tex.
225-260 MC AND 960 MC COMPOSITE FEED ASSEMBLY.
Final test rept.
16 Nov 61, 66p. incl. illus. tables (Rept. no. AER-137)
(Subcontract to Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, Contract NASw-6)
Unclassified report

DESCRIPTORS: (*Transmission lines for *Telemetering antennas, Lobing, Tracking, Very high frequency.) (Antenna hardware, Antenna radiation patterns, Polarization, Standing wave ratios, Impedance, Measurement.)

The data and an evaluation are presented of information obtained during production tests conducted on 2 composite antenna feeds. These feeds will be used in the 85-ft. Diameter Tracking Antennas of the DSIF Net. The term composite antenna feed consists of a 960-mc Simultaneous Lobing Tracking Feed and a 225-260 mc listening feed combined into one feed assembly. The standard pre-installation tests on these antennas indicated both feeds were operating satisfactorily. (Author)

AD-274 523 Div. 8, 6
(TISTE/NTM) OTS price $7.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 7. ENGINEERING.
Quarterly progress rept., 15 July-15 Oct 61.
28 Mar 62, 70p. incl. illus. tables, 5 refs.
(Contract AF 19(604)7400)
(AFESD TN 61-1029) Unclassified report

DESCRIPTORS: (*Parabolic antennas, *Radar antennas, *Radomes, Test facilities, Design.) (*Radar stations, Construction, Radar equipment, Communication equipment, Instrumentation.) (Search radar, Radar tracking, Masers.) (*High pressure research, Instrumentation.) Radiometers.

Contents:
Status of present field radars
Experimental radar Mark 1 at Boston Hill
AN/FPS-31 radar at Jug Handle Hill
Communications and radar tracking antennas
(Project West Ford)
Maser status
Phased array instrumentation radar
Haystack antenna system
Bearing research program (Alloyd Corporation)
High-power tube program
Mobile radiometer
Induction-heated pressure chamber
Hardened radome program
TTR radome
Paraboloidal thin shells
Fifty-five foot diameter metal space-frame radome
Materials studies
Dielectric tests
Closed-cycle cryostat
Special equipment for high-pressure research
Millstone radar modification
Materials and processing - polyurethane foam

AD-274 524 Div. 8
(TISTE/CDM) OTS price $3.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
A DIPLEXER USING HYBRID JUNCTIONS,
by L. J. Ricardi. 7 Feb 62, 29p. incl. illus. table (Technical rept. no. 255)
(Contract AF 19(604)7400)
(AFESD TDR 62-75) Unclassified report

DESCRIPTORS: (Design, Theory, *Waveguide filters, *Waveguide joints for *Multiplex transmission, Multiple operation, Radio transmitters, Radio receivers, Radar transmitters, Radar receivers, Ultra high frequency, Superhigh frequency, Microwave frequency.) Switching circuits, Coaxial filters, *Power dividers, Waveguide couplers, Transmission lines, Mathematical analysis.

A study was made of a diplexer. This filter connects a transmitter and a receiver to a common antenna so that both may be operated simultaneously when their frequencies are not identical. The diplexer described uses hybrid junctions, is easily tuned and can be designed in a simple, straightforward manner. Its maximum power-handling capacity is the same as that of the connecting transmission line, and its insertion loss is unusually low. An analysis of this filter and of a long-stub filter is presented, in addition to the design procedure for, and the experimental results obtained with, a specific model. A discussion of its use in place of an in-line long-stub, or cavity, filter is included and the general configuration of a four-frequency multiplexer is presented. Additional curves which can be used to design similar units using the popular standard waveguide sizes are included. (Author)

AD-274 543 Div. 8
(TISTP/TL) OTS price $4.60

Electronic Communications, Inc., Timonium, Md.
MILLIMETER WAVE RESEARCH.
by J. M. Cotton, F. Sobel, and John O. Wedel.
28 Feb 62, 38p. incl. illus. 4 refs. (Technical note no. 3)
(Contract AF 30(602)2457, Proj. 4506)
(RADC TDR 62-154) Unclassified report

DESCRIPTORS: (*Microwaves, Extremely high frequency, Analysis, Wave transmission, Electromagnetic waves, Spectrographic analysis, Reflectors, Circuits, Sheets.) (Instrumentation, Amplifiers, Modulators, Discriminators, Klystrons, Frequency multipliers, Harmonic analyzers.) (Optics, Waveguides, Design, Radio receivers, Antennas.) (Ferrites, Detectors, Power supplies.)

Fresnel zone plate analysis is extended herein. Details are given concerning frequency and bandwidth characteristics of the zone plates as a function of the number of zones. Description of the progress of instrumentation of the proposed measurement system is included. Several of the waveguide and circuit components for the system must be designed and built for this specific application. The report includes design data for some of these components. (Author)

AD-274 557 Div. 8
(TISTE/CAM) OTS price $3.60

Microwave Lab., Stanford U., Calif.
GENERAL STUDIES IN HIGH-POWER MICROWAVE CONCEPTS.
Quarterly rept. no. 19, 1 Oct-31 Dec 61.
Mar 62, 24p. incl. illus. (Scientific rept. no. 39; ML rept. no. 894)
(Contract AF 19(604)1930, Proj. 4619)
(AFCRL 62-143) Unclassified report

DESCRIPTORS: (*Microwaves, Propagation, Electromagnetic waves, *Plasma physics, Electron beams, Cesium, Electric fields, Noise (Radio), Nonlinear systems, Theory.) (*Microwave equipment, *Parametric amplifiers, *Microwave amplifiers, *Electron tubes, Cathodes (Electron tubes), Electromagnets, Frequency multipliers, Design, Tests.)

Contents:
Microwave tube studies
Crossed-field electron guns
Electrostatic beam-type parametric amplifier
Plasma physics studies
Electron beam interaction with a plasma
Plasma parametric amplifier
High-frequency diagnostic techniques for plasmas
Electron beam interaction with a cesium plasma
Plasma projects
Production and investigation of highly ionized plasmas
Nonlinear plasma theory
Noise in plasmas
Plasma diagnostic techniques
Variational methods in plasma physics
Plasma harmonic generation

AD-274 619 Div. 8
(TISTE/CAM) OTS price $2.60

Micromega Corp., Venice, Calif.
C-BAND, WIDEBAND SOLID STATE AMPLIFIER.
Quarterly technical note no. 2, 15 Sep-15 Dec 61, by Conrad E. Nelson. 15 Dec 61, 14p. illus. 3 refs.
(Contract AF 30(602)2525, Proj. 5573)
(RADC TDR 62-110)
Unclassified report

DESCRIPTORS: (*Parametric amplifiers, Solid state physics, C band, Broadband, Design, Tests.) (*Microwave amplifiers, *Electronic circuits, Tuned circuits, Tuning circuits, Diodes, Silicon, Packaging, Resonance, Theory, Mathematical analysis.) (*Tuned amplifiers, Backward-wave oscillators.)

Effort continued on the development of two experimental models of a low noise parametric amplifier.. The first amplifier was an untuned amplifier, broadband from 4000 to 6000 mc, and the second amplifier was electronically tunable from 4000 to 6000 mc. For the broadband amplifier, a microwave circuit was constructed that simultaneously resonates the diode at the center signal and the center idler frequencies. This circuit, however, reduces the available signal and idler circuit bandwidths by 30%. The experimental diode self resonant frequency was lower than the theoretical resonant frequency determined from the diode capacitance and the manufacturer's specified lead inductance. This reduced the available idler circuit bandwidth. Schemes to achieve an electronically tunable amplifier were reviewed. The optimum scheme was to develop a wideband signal circuit, a narrowband idler circuit and use a backward wave oscillator to drive a broadband pump circuit. (Author)

AD-274 621 Div. 8, 25, 26
(TISTE/CDM) OTS price $5.60

Sylvania Electric Products, Inc., Woburn, Mass.
INVESTIGATION AND DEVELOPMENT IN THE AREA OF EPITAXIAL GROWTH TECHNIQUES.
Quarterly rept. no. 3, 1 Dec 61-1 Mar 62,
by P. Wang, V. Sils, and R. Berkstresser.
1 Mar 62, 50p. incl. illus. tables.
(Contract NObsr-85431)
Unclassified report

DESCRIPTORS: (*Diodes, Transistors, *Semiconductors, Design, *Manufacturing methods.) (Crystals, *Single crystals, Lattices, Growth, Thin films, Silicon, Deposits, Thickness.) (Chemical impurities, Control, Determination, Diffusion.) (Thin films, Measurement by Infrared spectroscopy.)

Techniques for growing abrupt and graded epitaxial junctions have been under study. The control of P-type layer resistivity by several doping techniques has been investigated, and the study of the control of N-type layer resistivity with phosphorus doped argon is completed. The diffusion technique developed earlier for the determination of epitaxial layer impurity profiles was refined and widely used. A study of impurity profile control of N/N+ layers was conducted. An oxide masking technique against epitaxial deposition has been further investigated. Experiments on oxidation of the epitaxial surfaces for device passivation have been continued. Samples of diodes made with oxide layers grown in the epitaxial furnace were submitted. Work on growing epitaxial multi-layer structures continued. Samples of full epitaxial P-N junction multi-diodes were also submitted. Further study on epitaxial layer crystalline perfection was conducted. The experiment of substrate orientation versus junction parameters and growth rates was repeated. (Author)

AD-274 630 Div. 8, 7
(TISTE/NTM) OTS price $1.60

Westinghouse Electric Corp., Baltimore, Md.
ELECTROLUMINESCENT FERROELECTRIC (ELF) SOLID

STATE DISPLAY,
Quarterly interim development rept. no. 15,
1 Dec 61-28 Feb 62.
28 Feb 62, 11p. incl. illus.
(Contract NObsr-72782)
Unclassified report

DESCRIPTORS: (*Display systems, Solid state physics, Luminescence, *Luminescent materials.) (*Electronic switches, Platinum, Palladium, Ionic current, Life expectancy, Electrostriction, Switches.) (Resistors, *Ferroelectric materials, Suppressors.) (Sandwich construction, Laminates.)

Research continued in the fabrication of electroluminescent ferroelectric (ELF) cells. The cells are prepared on aluminum substrates using BaTiO3 in polyvinyl chloride with a solids ratio of 24:1 as a barrier layer and VB206P in ME-34 with a solids ratio of 3:2 as the emitting layer. The secret of fabrication of good cells is the proper application of the barrier layer which must be smooth for good leakage characteristics and light output. A number of life tests on cells indicate that an increase in life will result if the screen is operated in a desicated atmosphere. A number of groups of switches were made and a final design was selected. With respect to sandwich structure, the first sandwich laminates were started. An analysis was made of the matrix configuration and requirements for the electrostrictive switch in the ELF application.

AD-274 639 Div. 8
(TISTE/CAM) OTS price $1.60

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF AN E-BAND AMPLIFIER.
Technical note no. 4, 1 Oct-31 Dec 61,
by E. W. Kinaman. 18 Jan 62, 10p. incl. illus.
(Contract AF 30(602)2422, Proj. 5573)
(RADC TDR 62-59) Unclassified report

DESCRIPTORS: (*Microwave amplifiers, *Traveling wave tubes, Extremely high frequency, Signal-to-noise ratio, Noise (Radio), Reduction, *Band-pass filters, Tuning devices, Yttrium, Garnet.) (Cathodes (Electron tubes), Miniature electronic equipment, Manufacturing methods, Tantalum.) (Cathodes (Electron tubes), Heating, Anodes, Helixes, Standing wave ratios, Frequency shift, Sensitivity, Magnets, Focusing, Tests.)

The first low noise tube was completed. A second tube is nearing final alignment - this tube will incorporate an output waveguide slide in the helix wedge support block. The slide has markedly reduced wedge breakage to the stage where it no longer is a serious problem. Work has started on the reduced mass cathode - heater assembly, which, when incorporated (tube no. 3, on) should eliminate the present heater burnout problem. Work is in progress, assembling the YIG balls in the non-reciprocal version of the filter. These balls will be magnetically orientated perpendicular to the plane of the common waveguide wall slide by utilizing an electromagnet and vibrator as assembly tools. (Author)

AD-274 682 Div. 8, 25
(TISTE/CAM) OTS price $6.60

Page Communications Engineers, Inc., Washington, D. C.
STUDY OF HF STEEP-ANGLE ANOMALIES.
Final rept., 15 Oct 60-14 Oct 61.
Dec 61, 1v. incl. illus. table (Rept. no. PCE-R-9071A)
(Contract AF 19(604)7475, Proj. 4603)
(AFCRL 62-15) Unclassified report

DESCRIPTORS: (*Communications theory, *Radio signals, *Radio waves, Wave transmission, High frequency, Attenuation, Propagation, Ionosphere models, Analysis, Theory.) (Electromagnetic waves, Polarization, Plasma physics, *Magneto-optic rotation, Phase shifters, *Ionospheric propagation, Measurement, Test equipment, Test methods.)

Results are given of a study of hf steep-angle anomalies by means of a program of signal analysis and data recording and through the application of magnetoionic theory. Two types of anomalies were studied: Cusp fading, observed as a periodic variation of signal strength over paths of several hundred miles, and the two-tone effect, observed when receiving WWV over a 58-mile path. Conclusions were that periodic fading to deep cusps apparently resulted from magnetoionic interference in the F layer. Changes in median recorded level of WWV reception with tone modulation were explicable as a diversity effect for the ground backscatter signal and a result of dissimilar carrier and sideband antenna patterns for layer propagation. (Author)

AD-274 684 Div. 8, 6
(TISTE/CDM) OTS price $2.60

Rand Corp., Santa Monica, Calif.
APPROXIMATE BAND-PASS LIMITER ENVELOPE DISTRIBUTIONS,
by Worthie Doyle and Irving S. Reed. Feb 62,
21p. incl. illus. 20 refs. (Memo. no. RM-2987-PR)
(Contract AF 49(638)700, Proj. Rand)
Unclassified report

DESCRIPTORS: (*Radar signals, Noise (Radar), Functional analysis, Numerical methods and procedures, *Limiters, Band-pass filters, Broadband, Narrowband in *Radar receivers, Search radar.)

An approximate distribution is computed for the envelope of sine wave plus noise after passage through a wide-band filter, limiter and narrow-band filter. As the input bandwidth to the limiter increases, it is shown that the output envelope distribution converges to the usual sine wave in noise envelope distribution, without limiting, but with a definite 1.4 db loss. First-order correction terms are supplied which make it possible to compute first-order statistics for the output envelope when the output signal-to-noise ratio is on the order of one. (Author)

AD-274 692 Div. 8
(TISTW/RD) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
A SYNCHRONOUS DETECTOR,
by L. S. G. Kovasznay, A. E. Fuhs, and T. M. Smith. 28 Feb 62, 14p. incl. illus. (Rept. no. TDR-930(2230-03)TN-1)
(Contract AF 04(647)930)
(DCAS TDR 62-8) Unclassified report

DESCRIPTORS: (*Detectors, Synchronizers, Transistors.)

A synchronous detector has been developed which performs 2 functions: (1) It operates as a phase sensitive demodulator providing a dc signal proportional to the component of an ac signal in phase with a reference voltage; and (2) it behaves as a bandpass filter always centered at the driving frequency. A circuit schematic is given for the detector, and its operation is described. Performance, experimentally determined, is compared with a theory derived for the detector. (Author)

AD-274 705 Div. 8, 25
(TISTP/JW) OTS price $3.60

Aerospace Corp., El Segundo, Calif.
ELECTRONICS PROGRAM. QUANTUM ELECTRONICS.
Semiannual technical rept., 1 July-31 Dec 61.
28 Feb 62, 29p. refs. (Rept. no. TDR-930(2250-20) TR-1)
(Contract AF 04(647)930)
(DCAS TDR 62-67) Unclassified report

DESCRIPTORS: (*Lasers, Helium, Neon, Excitation, *Optics, *Masers.) (Rare gases, Diffusion, Electrons, Density.)

A laser employing an rf-excited gas discharge in a mixture of helium and neon is being studied analytically and experimentally. Experiments utilizing new developments in the field of optical masers are described. These include the interaction of intense laser beams with atoms. The effects considered were optical multiple quantum transitions by excitation with ruby laser light and level shifts produced by intense light sources. The study of the interaction of intense coherent optical beams with materials has started. Preliminary experimental work with low-power and medium-power lasers is described. The production of half-frequency radiation from an intense laser beam in a non-linear medium has been predicted theoretically and experiments have been initiated to detect the effect. In some paramagnetic materials there is evidence that anisotropic exchange is a dominant relaxation mechanism. A phenomenological analysis, employing the Block equations, yields the result that when such a system is driven into the saturation regime, odd harmonics of the fundamental appear in the output. (Author)

AD-274 718 Div. 8
(TISTE/CAM) OTS price $1.60

Watkins-Johnson Co., Palo Alto, Calif.
APPLIED RESEARCH ON A HIGH-POWER MILLIMETER-WAVE GENERATOR.
Interim engineering rept. no. 3, 1 Dec 61-28 Feb 62,
by James W. Sedin. 12 Apr 62, 15p. incl. illus.
(Contract AF 33(616)8369)
Unclassified report

DESCRIPTORS: (*Backward-wave oscillators, *Radiofrequency generators, Pulse transformers, Pulse generators, Feasibility studies, Design, Manufacturing methods.) (Microwaves, Waveguides, Electronic circuits, Microwave networks, Superhigh frequency, Electroforming, Standing wave ratios, Measurement.) (*Electron tubes, Cathodes (Electron tubes), Electron guns, Beam power tubes, Anodes (Electron tubes), Magnetic fields, Focusing, Materials, Test equipment.)

A Mumetal flux shield and core iron anode were constructed that resulted in less than 3 gauss at the location of the cathode when the gap field is 4500 gauss. The corners of the discs in the disc-loaded waveguide circuit were rounded to reduce the danger of RF arcing. The effects on the circuit bandwidth and match were measured. After some difficulty, an electroformed circuit and matching waveguides were completed. (Author)

AD-274 721 Div. 8, 6
(TISTW/DLW) OTS price $3.60

Cornell U., Ithaca, N. Y.
NOTES ON THE CHARACTERISTICS OF RADAR SIGNALS IN INCOHERENT SCATTERING,
by T. Laaspere. 30 Sep 61, 31p. incl. illus. table, 20 refs. (Scientific rept. no. 1; Research rept. no. RS 29)
(Contract AF 19(604)8804)
(AFCRL 62-104)
Unclassified report

DESCRIPTORS: (*Radar signals, Radar pulses, Scattering, *Attenuation, Ionospheric propagation, *Ionosphere, Temperature, Wave transmission, *Electromagnetic wave reflections, Integral transforms, Spectrographic analysis.)

Expressions have been derived for spectra of scattering for scattering of the incoherent kind. These expressions contain temperature as a parameter, which could in principle be determined by making suitable measurements on the spectrum of scattering. The importance of accuracy in such measurements becomes clear, if it is realized that if the measurement of the width of the spectrum is in error by a factor F, the deduced value of temperature will be in error by the factor F2, the width of the spectrum being proportional only to the square root of the temperature. All predictions made so far for the spectra are based on the assumption that a sine wave is transmitted and that the received signal is observed continuously. The effects of pulsing the transmitter and gating the receiver are discussed. In most temperature measurements these effects should clearly be taken into account. Even in cases where this is not necessary, the measurement of temperature is not a trivial matter. The measurement of temperature in such cases is discussed in detail. (Author)

AD-274 732 Div. 8, 14, 26
(TISTM/BRW) OTS price $2.60

General Electric Co., Schenectady, N. Y.
RESEARCH ON BINDER TECHNIQUES FOR HIGH TEMPERATURE RADOME STRUCTURES.
Interim engineering rept. no. 3, 17 Oct 61-17 Jan 62,
by Henry T. Plant, W. H. Marks, and T. J. Jordan.
17 Jan 62, 11p. incl. illus. tables.
(Contract AF 33(616)8176, Proj. 1-(670-4161))
Unclassified report

DESCRIPTORS: (High temperature research, *Radomes, Materials, Reinforcing materials, Ceramic materials, Ceramic fibers, Asbestos fiber, Mica, Aluminum compounds, Phosphates, Silicon compounds, Dioxides, Glass, Spheres, *Laminates, *Binders, Filament wound construction.) Mechanical properties, Dielectric properties, Viscosity.

Substitution of glass microspheres for particulate fibers in the silica fiber-reinforced AlPO4 laminates resulted in low viscosity binder. For the most part laminates were weak. Little or no

improvement in electrical properties was observed. Two formulations appeared worthy of investigation. Based on the improved flexural strength obtained in previous experiments by substituting asbestos in formulations containing particulate fibers, asbestos was added to glass microsphere formulations. No marked increase in strength was noted. Substitution of silica microspheres for particulate fillers resulted in much lower viscosity, probably due to the fact that the silica does not react in the formulation. The laminates appeared tough, but since the molds were not filled with the lower viscosity binder, more silica must be used to fill molds to obtain valid data for future tests. Improved laminate modulus and strength using palygorskite or palygorskite paper as filler was indicated. Baymal colloidal alumina appeared to be the aluminum hydroxide material suitable for use with palygorskite. (Author)

AD-274 733 Div. 8, 26
(TISTE/CDM) OTS price $2.60

General Electric Co., Irmo, South Carolina.
SOLID TANTALUM CAPACITOR.
Quarterly engineering rept. no. 3, 1 Jan-31 Mar 62,
comp. by Archie Broodo. 20p. incl. illus. tables.
(Contract NObsr-85470)
Unclassified report

DESCRIPTORS: (*Electrolytic capacitors, *Tantalum capacitors, Design, *Manufacturing methods, Anodes (Electrolytic cell), Sintering.) (Surface properties, Manganese compounds, Oxides, Dioxides, Chemical impurities, Processing, Tests.) (Anodes (Electrolytic cell), Tantalum, Foamed metals, Electrical properties, Chemical analysis.)

Contents:
Phase I - The design of a solid electrolyte tantalum capacitor operating at 100-v at 85 C
Analytical methods
Effects on specific impurities
Anodes
Processing studies
Anodization
Solid electrolyte and cathode studies
Assembly and testing of units
Phase II - The design of a solid electrolyte tantalum capacitor operating at 20-v at 85 C
Foam tantalum processing
Property determination
Foam tantalum capacitors

AD-274 756 Div. 8, 25, 4
(TISTM/EJH) OTS price $10.10

Radley, J. A., Research Inst., Camden, N. J.
CATALYSIS AT SEMICONDUCTOR SURFACES.
Final technical rept. no. 1, 1 Mar 61-28 Feb 62,
by G. Elliott and J. A. Radley. 30 Mar 62, 23p.
incl. illus. tables, 110 refs.
(Contract DA 91-591-EUC-1698)
Unclassified report

DESCRIPTORS: (*Semiconductors, *Semiconducting films, Thin films, Single crystals, *Germanium, Silicon, Surfaces, Surface properties, Preparation, Ultraviolet radiation, *Catalysis, Chemical reactions, Oxidation, Benzaldehydes to Benzoic acids, Electrical properties, Impedance, Electric potential.) (Test equipment, Meters, Resistance, Measurement.) *Crystal rectifiers.

Benzaldehyde, in the form of a thin film on a supporting surface, is oxidized to benzoic acid with a quantum yield of about 7 in 366 microns radiation. No significant difference in reaction rate is found on the surface of n-type Ge, p-type Ge or glass. About 20% of the benzaldehyde is not accounted for as benzoic acid at the end of the reaction. Treatment of n-type Ge surfaces with benzaldehyde and irradiation improves the reverse impedance of surface-barrier rectifying contacts. This effect results from a permanent increase in the number of negatively-charged surface states or a modification of the structure of the surface oxide layer. Large electrostatic charges are formed at the surface of n-type Ge in wet O or Ar. Contact potentials, of up to 100 volts, were measured. The Ge surface is predominantly an electron-accepting catalyst. A semiautomatic test meter was developed for the measurement of semiconductor materials.

AD-274 783 Div. 8
(TISTE/CAM) OTS price $4.60

Aero Geo Astro Corp., Alexandria, Va.
INVESTIGATIONS OF FLUSH-MOUNTED ANTENNAS,
by D. M. Bowie and B. R. Gross. 31 Dec 61, 38p.
incl. illus. tables (Technical note no. 4)
(Contract AF 30(602)2386, Proj. 4506)
(RADC TDR 62-152) Unclassified report

DESCRIPTORS: (*Antennas, Reflectors, Antenna radiation patterns.) (Wave transmission, Electromagnetic wave reflections, Propagation, Phase measurement, Antenna horns, Lobing, Dielectrics, Materials, Test methods.)

The principal investigation concerned the far-field effects of a planar system of transverse metallic barriers of minimal height on waves emergent from moderately directive, low-silhouette feed structure. Comparison of measured far-field patterns was made for a number of cases involving both constant and variable barrier spacing. A comparison of representative measured gain values for a metallic barrier structure of large extent with those for a single horizontal reflecting plane was made. Results for cases approximating arithmetic variation of barrier spacing using 3 rates of increase with distance from the feed aperture indicate that the number of barriers for optimum effect is determined by a requisite value of spacing near the feed and a fixed upper limit of spacing associated with spurious grating effects. (Author)

AD-274 809 Div. 8, 25
(TISTP/FR) OTS price $9.60

Emertron, Inc., Silver Spring, Md.
SCATTERING OF ELECTROMAGNETIC WAVES BY ULTRASONIC BEAMS.
Quarterly progress rept. no. 2, 16 Sep 61-30 Mar 62.
30 Mar 62, 103p. incl. illus. tables. (Rept. no. QPR-2-5514)
(Contract DA 36-039-sc-87236, Proj, 3A99-20-001)
Unclassified report

DESCRIPTORS: (*Radio waves, *Extremely high frequency, *Scattering, *Ultrasonic radiation, Air, Heat, Precipitation, Projectiles.) (Radio equipment, Extremely high frequency.) (Sound generators, Ultrasonic radiation.)

The results of laboratory investigations on sonic generators are reviewed. Field experiments to determine the feasibility of scattering electro-

magnetic waves by means of ultrasonic beams are described along with a brief presentation of the characteristics of the radio communications equipment used in the field evaluation program. The field experiments were conducted over an open range of 154 feet. No positive results were obtained. In view of the limitations imposed on the experiment by both the sonic and radio equipments, these results cannot be considered absolutely definitive. (Author)

AD-274 810 Div. 8, 25
(TISTP/FR) OTS price $10.10

Emertron, Inc., Silver Spring, Md.
SCATTERING OF ELECTROMAGNETIC WAVES BY ULTRASONIC BEAMS.
Rept. no. 3 (Final), 15 June 61-30 Mar 62. 30 Mar 62, 112p. incl. illus. table (Rept. no. FR-1-5514)
(Contract DA 36-039-sc-87326, Proj. 3A99-20-001)
Unclassified report

DESCRIPTORS: (*Radio waves, *Extremely high frequency, *Scattering, *Ultrasonic radiation, Air, Heat, Precipitation, Projectiles.) (Ultrasonic radiation, Propagation, Air, Refractive index.) (Sound generators, Ultrasonic radiation.) (Radio equipment, Extremely high frequency.)

Factors affecting the scattering of radio waves by sonic beams are discussed from the point of view of existing theory. A review of sonic sources is presented along with the detailed characteristics of the sonic generators investigated during the course of field experimentation. The millimeter wave communications equipment used as the electromagnetic source is also briefly described. Field experiments performed over an open range of 154 feet yielded no positive results in indicating that scattering of radio waves can be effected by means of sonic energy. These results cannot be considered absolutely definitive in the light of limitations imposed on the experiment by both the sonic and radio equipment. (Author)

AD-274 819 Div. 8
(TISTE/NTM) OTS price $3.60

Microwave Research Associates, Inc., Burlington, Mass.
HIGH POWER TRANSMISSION LINE AND ASSOCIATED MICROWAVE PARTS.
Quarterly progress rept. no. 1, 1 July-30 Sep 61, by Meyer Gilden. 18 Dec 61, 25p. incl. illus. tables, 2 refs.
(Contract NObsr-85455)
Unclassified report

DESCRIPTORS: (*Transmission lines, Microwaves, S band, *Radiofrequency power, Design.) (*Waveguides, Microwave frequency, Radar duplexers, Waveguide couplers, Waveguide windows, *Microwave equipment, Gases, Pressure, Temperature, Cooling by Convection, Waveguide filters, Surface properties, Analysis.) (Propagation, Wave transmission, Attenuation, Absorption.)

A program was initiated to design, construct, and test an optimum high power transmission line with associated parts for S-band frequencies and to arrive at recommendations for ultra high power transmission lines. The design of high power transmission lines for S-band frequencies is treated. The analysis, supported by experimental measurements, emphasizes the power limitations imposed by waveguide temperature rise where only convection and radiation are the cooling processes. Oversized rectangular waveguide with the addition of practical sized cooling fins can meet the requirements of the hardware phase of the program. Further extension of the analysis, including rectangular as well as circular waveguide, suggests that even ultra high power transmission may be feasible in oversized waveguide without resorting to forced cooling techniques. (Author)

AD-274 820 Div. 8
(TISTE/NTM) OTS price $2.60

Microwave Associates, Inc., Burlington, Mass.
HIGH POWER TRANSMISSION LINE AND ASSOCIATED MICROWAVE PARTS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61, by Meyer Gilden. 20 Mar 62, 15p. incl. illus. tables, 2 refs.
(Contract NObsr-85455)
Unclassified report

DESCRIPTORS: (*Transmission lines, Microwaves, S band, *Radiofrequency power, Design.) (*Waveguides, Microwave frequency, Cavity resonators, *Microwave equipment, Waveguide couplers, Waveguide irises, Temperature, Pressure, Cooling, Fins, Convection, Liquid cooled, Waveguide filters, Heat transfer, Coolant, Coolant pumps, Heat exchangers.)

Design considerations for a 100 ft of S-band transmission line for operation at 45 kw average power and 15 megawatts of peak power are presented. Since high average power is the major consideration, an important item is the environment into which the heat from the waveguide will be dissipated. Finned waveguide, using natural convection and radiation cooling can adequately handle the required average power if the environment is adequate. If the waveguide is placed in a confined region, it is necessary to use a forced method of cooling, preferably by liquid. If pressurization is not desired, the tall waveguide (in this case L band waveguide turned on end) would suffice. However, the problem arises of constructing mode filters to eliminate or absorb the undesired modes which will be excited in this waveguide at S-band frequencies. The analysis on heat dissipation has shown that the finned waveguide using convection and radiation for heat transfer can easily give 3 to 1 improvement in the power dissipation capabilities. Forced liquid cooling, though requiring a coolant, a pump and a heat exchanger can be much more effective. (Author)

AD-274 821 Div. 8
(TISTE/CAM) OTS price $4.60

Microwave Associates, Inc., Burlington, Mass.
HIGH POWER CAPABILITIES OF WAVEGUIDE SYSTEMS.
Quarterly progress rept. no. 3, 1 Aug-31 Oct 61, by Meyer Gilden. 18 Jan 62, 17p. illus. 3 refs.
(Contract NObsr-85190)
Unclassified report

DESCRIPTORS: (*Waveguides, S band, X band, Electrical properties, Reliability, Test methods.) (Waveguide joints, Waveguide bends, Cavity resonators, Air, Electric fields.) (Microwaves, Propagation, Attenuation.) (*Heat transfer, Cooling, Temperature, Gases, Pressure.) (Harmonic analysis, Mathematical analysis, Measurement, Test equipment.)

The limitations of high power waveguide systems were studied. The usefulness of standard heat transfer expressions was demonstrated for calculating the temperature of waveguides under high

average power conditions. The results of cavity measurements of breakdown are presented for high dielectric strength gases which yield improvements in peak power handling in excess of 10:1 at atmospheric pressure. These results include observation of deviations from the simple pressure squared dependence of breakdown power. The dependence of temperature rise on the scaling of waveguide systems is analyzed and finally some of the problems encountered in high power systems are discussed. (Author)

AD-274 822 Div. 8
(TISTE/CAM) OTS price $3.60

Microwave Associates, Inc., Burlington, Mass.
HIGH POWER CAPABILITIES OF WAVEGUIDE SYSTEMS.
Quarterly progress rept. no. 4, 1 Nov 61-31 Jan 62,
by Meyer Gilden. 14 Apr 62, 18p. illus. 9 refs.
(Contract NObsr-85190)
Unclassified report

DESCRIPTORS: (*Waveguides, C band, K band, Electrical properties, Reliability, Test methods.) (Waveguide joints, Waveguide couplers, Waveguide windows, *Cavity resonators, Frequency shift, Tuning devices, Electric fields, Magnetons, *Radiofrequency power, Pressure, Gases, Air, Measurement, *Microwaves, Temperature, Test equipment, *Handbooks.)

The study of microwave breakdown at high pressures continued and material for the revised handbook on the power handling capabilities of high power waveguide systems is presented. The breakdown measurements of air, SF6 and Freon 12, reduced to absolute values, satisfactorily extend low pressure measurements. A discussion is included of the calibration of the cavity used in the breakdown measurements. The cavity was calibrated to relate the electric field strength in the center of the cavity to the power measured in the transmission line. Absolute breakdown curves are given for the various gases discussed and these results are compared to the work of others. Results are given of breakdown measurement of several waveguide components. (Author)

AD-274 833 Div. 8, 26
(TISTE/NTM) OTS price $4.60

Pacific Semiconductors, Inc., Lawndale, Calif.
INTERDIGITATED SILICON TRANSISTOR PROGRAM.
Interim technical engineering rept., 19 Dec 61-18 Mar 62,
by B. Rappaport and F. J. Steinebrey. Apr 62, 26p. illus. 4 refs.
(Contract AF 33(600)43029)
(ASD TR 7-850, vol. 2) Unclassified report

DESCRIPTORS: (*Transistors, Silicon, High frequency, *Semiconductors, *Manufacturing methods, Production, Processing.) (Crystals, Silicon, Chemical impurities, Diffusion, Ethyl radicals, Silicates, Propyl radicals, Borates, Phosphorus compounds, Oxychlorides, Inductance.) *Packaged circuits, Design, Theory.

Progress in the development of manufacturing methods and processes for the production of a family of power transistors is discussed. Four major areas of effort are described. These are: epitaxial collector deposition; base and emitter diffusion improvements; fabrication of the type 3-20 transistor; package design work. Dislocations were found as predicted at the interface of the substrate and the epitaxial layer. Effects of these dislocations may be reduced by deposition of a thick collector region. Resistivity of 39 ohm-cm was obtained in the epitaxial layer using commercial trichlorosilane. Several reactor systems are being tested to choose the most suitable for production. A phosphorus oxychloride emitter diffusion process was tried in the laboratory and is ready for testing in production. An ethyl silicate and propyl borate base predeposition operation is undergoing evaluation. Samples of the type 3-20 transistor design were successfully fabricated in an interim package. Theory, supported by preliminary experiments, indicate the desirability of a package with two emitter leads to minimize lead inductances. (Author)

AD-274 845 Div. 8
(TISTE/CAM) OTS price $2.60

Sperry Gyroscope Co., Great Neck, N. Y.
BEAM-TYPE PARAMETRIC AMPLIFIER.
Technical note no. 4, 1 Oct-31 Dec 61,
by R. Eng. I. Itzkan and A. Ferello. Jan 62, 22p. incl. illus. 3 refs. (Rept. no. NA-8210-8264-4)
(Contract AF 30(602)2433, Proj. 5573)
(RADC TDR 62-81) Unclassified report

DESCRIPTORS: (*Parametric amplifiers, *Microwave amplifiers, Broadband, Narrowband, X band, K band, Electronic circuits, Feasibility studies, Design, Theory.) (*Coupling circuits, Cyclotrons, Wave transmission, Propagation, Helixes, Impedance, Electron guns, Magnetic fields, Space charges, *Electron beams, Tests.)

Problems associated with coupler circuits were investigated. The areas of investigation were mode separation, cold losses, and signal attenuation. A detailed discussion of the thermal velocity spread, space charge, and lens effect which contribute to signal attenuation is presented. A modified bifilar helix was chosen as the coupler circuit in place of the more conventional ellipitic helix. A modified quadrifilar helix, to improve the impedance characteristics at the axis of the pump circuit, was built. The four-bar quadrupole circuit was retested for possible application as a pump circuit. (Author)

AD-274 847 Div. 8, 26
(TISTE/CAM) OTS price $19.75

Western Electric Co., Laureldale, Pa.
PRODUCTION ENGINEERING MEASURE. 2N667 AND 2N668 RUGGEDIZED AUDIO TRANSISTORS.
Final rept., 30 May 58-6 Nov 61,
by G. T. DeMoss. 6 Nov 61, 336p. incl. illus. tables.
(Contract DA 36-039-sc-81252)
Unclassified report

DESCRIPTORS: (Audiofrequency, *Transistors for Transistor amplifiers, *Audio amplifiers, Amplifiers, Design, *Manufacturing methods, Automatic, Production, Germanium, Processing, Materials, Alloys, Electrical properties, Surfaces, Encapsulation, Test equipment, Reliability, Mechanical properties.)

A review of the significant accomplishments made on the NPN and PNP versions of the ruggedized alloy transistor is presented. The development and use of the semi-automatic machinery used on

the project is described in detail. Included are all drawings, comprehensive flow charts, manufacturing layouts (detailed assembly and testing shop instructions), and equipment lists with capacities. Pilot run fabrication yields, test data and parameter distributions are shown along with final test specifications. Photographs and schematic block diagrams are shown for the electrical test sets used. Efforts to advance the technology of alloy transistors by providing devices capable of withstanding high mechanical stress without compromising the electrical parameters of the devices were fulfilled. (Author)

AD-274 848 Div. 8, 9, 25
(TISTP/TL) OTS price $3.60

Hammond Metallurgical Lab., Yale U., New Haven, Conn.
THE INFLUENCE OF POINT DEFECTS ON THE KINETICS OF DISSOLUTION OF SEMICONDUCTORS.
Final rept.,
by George Simkovich and J. Bruce Wagner, Jr.
15 Jan 62, 37p. incl. illus. 17 refs. (Technical rept. no. 7)
(Contract Nonr-60934)

Unclassified report

DESCRIPTORS: (*Kinetic theory of Dispersion of *Semiconductors, Lead compounds, Sulfides, Zinc compounds, Oxides in concentrated Nitric acid and aqueous Solutions of Hydrochloric acid.) (Doping of Silver compounds, Sulfides, Bismuth compounds, Nickel compounds, Aluminum compounds, Lithium compounds.) Chemical reactions.

The kinetics of dissolution of semiconductors as a function of point defects introduced by varying the stoichiometry and/or by doping additions have been studied. Experiments on two ionic semiconductors, lead sulfide and zinc oxide, are described. Under conditions involving a relatively large change in the oxidation states of the constituents in the solid-liquid reaction, the kinetics have been shown to vary markedly with point defect concentration. Preliminary results of other investigations under this contract are also mentioned. (Author)

9. FLUID MECHANICS

AD-274 535 Div. 9
(TISTP/TL) OTS price $1.10

AVCO Everett Research Lab., Mass.
VORTEX LOOPS IN THE TRAILS BEHIND HYPERVELOCITY PELLETS,
by A. Goldburg and J. A. Fay. Feb 62, 7p. incl. illus. 8 refs. (Rept. no. AMP 75)
(Contracts AF 04(694)33 and DA 19-020-ORD-5476)
(BSD TDR 62-46)
Unclassified report

DESCRIPTORS: *Vortices in Condensation trails of *Hypervelocity projectiles, *Pellets in Xenon, Blunt bodies in *Subsonic flow and *Hypersonic flow at Low Reynolds number, Self Luminescence, Photographs of Turbulent flow, Hypersonics, Wake.

The periodic shedding of vortices behind blunt bodies in subsonic flow at low Reynolds numbers is a well-known phenomenon. Self-luminous photographs of the hypervelocity trail behind spherical pellets in xenon at a free stream Mach number of about 25 are compared with those of dye-traced incompressible wakes. As a result it is postulated that, as in the subsonic case, vortex loop generation in the body base region is the controlling mechanism for transition to and development of the turbulent hypersonic wake. (Author)

AD-274 551 Div. 9
(TISTP/TL) OTS price $5.60

International Business Machines Corp., San Jose, Calif.
EXPERIMENTAL INVESTIGATION OF WHIRL IN SELF-ACTING AIR-LUBRICATED JOURNAL BEARINGS,
by D. B. Reynolds and W. A. Gross. 27 Oct 61, 55p. incl. illus. tables, 8 refs. (Rept. no. RJ-198)
(Contract Nonr-344800, Proj. NR 061-120)
Unclassified report

DESCRIPTORS: (*Gas bearings, Air or Gases, Lubrication, *Journal bearings, Tests.) (Velocity, Vector analysis, Motion, Loading, Hysteresis.)

Bearing characteristics influencing the threshold speed at which large-amplitude self-excited whirl occurs in complete, air-lubricated journal bearings were experimentally investigated. By varying slenderness and clearance ratios and unit load, by opening or closing supply orifices, or by adding unbalance, the whirl threshold speed could be varied between zero and the limit set by the available power. Experimental methods of identifying the cylindrical and conical modes of synchronous and self-excited whirl are described. The whirl hysteresis region and the nature of whirl at speeds above the threshold are examined. Three methods of avoiding large-amplitude self-excited whirl are discussed. (Author)

AD-274 566 Div. 9, 1, 25
(TISTA/WAW) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
AN ANALYTICAL TREND STUDY OF PROPELLER WHIRL INSTABILITY,
by John L. Sewall. Apr 62, 45p. incl. illus. tables, 5 refs. (Technical note D-996)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-996.

DESCRIPTORS: (*Aerial propellers, *Airplane engines, *Airplane engine mounts, Gyroscopes, Dynamics, Stability, Oscillation, Damping, Mathematical analysis, Differential equations.)

An analytical trend study was made that extends the work by Reed and Bland in NASA Technical Note D-659 (AD-250 014) and Houbolt and Reed in Institute Aerospace Science Paper No. 61-34 on the precessional instability of a simulated engine-propeller configuration. Primary attention is given to the applications of simplified linear equations which are derived and which define the borderline conditions between stable and unstable motion in terms of damping coefficients in pitch and yaw. The equations apply to the case of separate elastic centers in pitch and yaw, and the results of some studies are included to show the effects of separate elastic centers. For the case of the common elastic center, the paper confirms the results reported in the two papers mentioned previously as to stiffness, damping, elastic-center location, and mass- or inertia-density ratio over a broader range of these parameters than was previously considered. The present study also includes the effects of polar-to-pitch (or polar-to-yaw) moment-of-inertia ratio and the effects of aerodynamic forces on whirl frequency at extreme values of yaw-to-pitch frequency ratio. (Author)

AD-274 571 Div. 9
(TISTA/LSK) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
CALCULATED MODE SHAPES AND PRESSURE DISTRIBUTIONS AT FLUTTER FOR A HIGHLY TAPERED HORIZONTAL TAIL IN SUBSONIC FLOW,
by Gerald L. Hunt and Gerald D. Walberg. Apr 62, 46p. incl. illus. tables, 4 refs. (Technical note D-1008)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1008.

DESCRIPTORS: (*Tails, *Stabilizers (Horizontal tail surface), Wind tunnel models, Load distribution, Pressure at *Flutter, Frequency during Subsonic flow, Mathematical analysis, Model tests.)

The mode shapes and pressure distributions of a highly tapered horizontal-tail surface moving in its flutter mode are determined by the subsonic kernel-function method for calculating unsteady aerodynamic loads. The tail surface investigated was previously flutter tested at Mach numbers from 0.75 to 1.20, and a kernel-function flutter analysis was performed for Mach numbers from 0 to 0.98 and reported in NASA TN D-379 (AD-241 923). The present investigation covers Mach numbers from 0.50 to 0.90 at reduced frequencies determined from the analytical flutter investigation. Those regions of the tail which absorb energy from the airstream at flutter are identified. The boundaries of these regions do not change appreciably with Mach number in the range investigated; however, a decrease in the aerodynamic stiffness forces with increasing Mach number is indicated. (Author)

AD-274 573 Div. 9
(TISTA/WAW) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
INCOMPRESSIBLE NONVISCOUS BLADE-TO-BLADE FLOW THROUGH A PUMP ROTOR WITH SPLITTER VANES,
by James J. Kramer, Norbert O. Stockman and Ralph J. Bean. Apr 62, 31p. incl. illus. tables, 5 refs. (Technical note D-1186)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1186.

DESCRIPTORS: (*Axial flow compressors, *Centrifugal pumps, *Axial flow compressor blades, Compressor rotors, Subsonic flow, Aerodynamics, Mathematical analysis, Design.)

The nonviscous flow through a mixed-flow pump impeller having one splitter vane between adjacent main blades was analyzed on a blade-to-blade surface of revolution using a previously reported analysis method. Solutions were obtained for a variety of flow conditions including several cases in which whirl is imparted to the flow upstream of the impeller. The velocity distributions on the main-blade surfaces and on the splitter-vane surfaces in the region of the splitter vane were strongly dependent on the assumed location of the rear stagnation points. Solutions were obtained by assuming values of slip factor and of division of flow around the splitter in addition to assuming the location of the rear stagnation points. These solutions indicated that the velocity distributions in the splitter-vane region are largely determined by the division of flow around the splitter-vane and that only the region in the immediate vicinity of the trailing edge is affected by the slip factor. Blade surface velocities were obtained from two approximate methods by specifying flow division and slip factor, and these results are compared with the more exact solutions of the analysis. (Author)

AD-274 574 Div. 9
(TISTA/LSK) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
VELOCITY POTENTIAL AND FORCES ON OSCILLATING SLENDER BODIES OF REVOLUTION IN SUPERSONIC FLOW EXPANDED TO THE FIFTH POWER OF THE FREQUENCY,
by Donald L. Lansing. Apr 62, 41p. incl. illus. tables, 16 refs. (Technical note D-1225)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1225.

DESCRIPTORS: (*Bodies of revolution, Supersonics, *Oscillation, Harmonic oscillators, Flutter, Lift, Pitch, Velocity, Moments, Mathematical analysis, Mathematical prediction, Potential theory, Theory.)

The linearized potential theory for supersonic flow about slender bodies of revolution undergoing harmonic oscillations is presented. The lift per unit length and the lift and moment coefficients on an arbitrary shape are expanded to the fifth power of the frequency. The theory is applied to a rigid cone undergoing harmonic translation and pitching motions. The results are compared with slender-body theory for the oscillating case and with Van Dyke's second-order theory for the steady case. (Author)

AD-274 575 Div. 9, 12
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
INVESTIGATION OF THE STATIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A 1/10-SCALE MODEL OF THE BLUE SCOUT JR. AT MACH NUMBERS FROM 0.40 TO 1.03,
by Thomas C. Kelly and Robert J. Keynton. Apr 62, 34p. incl. illus. 4 refs. (Technical note D-1228)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1228.

DESCRIPTORS: (*Space probes, *Sounding rockets, Wind tunnel models, Subsonic flow, Supersonics, Stability (Longitudinal), Pitch, Model tests.)

Results were obtained in the Langley 8-foot transonic pressure tunnel at Mach numbers from 0.40 to 1.03 for a 1/10-scale model of the Blue Scout Jr. Tests extended over an angle-of-attack range from about -6 to 6 degrees at a Reynolds number per foot of approximately 4.0 x 10 to the 6th power. Results indicated that the complete configuration exhibited nonlinear variations of normal-force and pitching-moment coefficients with angle of attack which were attributed to the downwash field of the forward fins and its effects on the rear fins. The complete configuration was stable about the test center-of-gravity location which was close to the estimated full-scale-vehicle initial center-of-gravity location. (Author)

AD-274 576 Div. 9, 12
(TISTA/LSK) OTS price $2.00

National Aeronautics and Space Administration, Washington, D. C.
STATIC AERODYNAMIC CHARACTERISTICS OF A TWO-STAGE AND A THREE-STAGE ROCKET VEHICLE AT MACH NUMBERS FROM 1.47 TO 4.63,
by Clarence A. Brown, Jr. and Ausley B. Carraway. Apr 62, 79p. incl. illus. 3 refs. (Technical note D-1232)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1232.

DESCRIPTORS: (*Hypersonic test vehicles, *Fins, Aerodynamic configurations, Wind tunnel models, Supersonics, Aerodynamics, Stability (Longitudinal), Pitch, Moments, Model tests.)

An investigation was conducted in the Langley Unitary Plan wind tunnel to determine the effects of fin cant and size on the static aerodynamic characteristics of a 0.081-scale model of a three-stage and a two-stage Trailblazer II configuration. Tests were performed at Mach numbers from 1.47 to 4.63 and at a Reynolds number per foot of 3.0 x 10 to the 6th power. The angle-of-attack range varied from approximately -5 to 5 degrees and angle of sideslip varied from approximately -4 to 4 degrees. All first-stage fins tested gave adequate static stability when the center-of-gravity travel of the flight model was taken into account. The presence of the auxiliary rocket motors in the lateral plane decreased the effectiveness of the fins in the pitch plane at the lower Mach number and increased the fin effectiveness at the higher Mach numbers. Removal of the auxiliary rocket motors from the first stage of the two-stage configuration reduced the axial force about 25% at the low Mach numbers and about 15% at the high Mach numbers. (Author)

Division 9 - FLUID MECHANICS

AD-274 577 Div. 9, 1
(TISTA/LSK) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
EXPERIMENTAL INVESTIGATION OF OSCILLATORY AERODYNAMIC FORCES, MOMENTS, AND PRESSURES ACTING ON A TAPERED WING OSCILLATING IN PITCH AT MACH NUMBERS FROM 0.40 TO 1.07,
by Sumner A. Leadbetter, Sherman A. Clevenson, and William B. Igoe. Apr 62, 43p. incl. illus. 9 refs. (Technical note D-1236)
Unclassified report

Also available from NASA, Washington 25, D. C. as NASA Technical note D-1236.

DESCRIPTORS: (*Wings, Wind tunnel models, Aerodynamics, Moments, Pressure, Oscillation, Pitch, Lift, Resonance, Subsonic flow, Supersonics, Transonics, Mathematical analysis, Theory, Integral equations, Model tests.)

Data were obtained for an aspect-ratio-3, taper-ratio-0.5 wing oscillating + or - 1.5 degrees about mean angles of attack of 0, 5, and 10 degrees. Results of the experimental investigation are compared, in the subsonic Mach number range, with those obtained by use of a theoretical analysis based on a numerical solution of the integral equation of subsonic lifting-surface theory. Comparisons with theory of the measured force, moment, and pressure coefficients and their respective phase angles, when the wing was at a mean angle of attack of 0 degrees, showed generally good agreement. (Author)

AD-274 578 Div. 9
(TISTA/WAW) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
INVESTIGATION OF VORTEX MOVEMENTS ABOUT A WING IN INTERMEDIATE AND HIGH SUBSONIC FLOW UNDERGOING A LARGE ANGLE-OF-ATTACK CHANGE IN A BLAST-INDUCED GUST,
by Donald R. McFarland. Apr 62, 46p. incl. illus. table, 10 refs. (Technical note D-1238)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1238.

DESCRIPTORS: (Airfoils, *Wings, Aerodynamics, Subsonic flow, Transonics, Gusts from Blast, Shock waves, Stalling, *Vortices, Model tests, Wind tunnel models.)

Measurements were made of the vortex movements about an airfoil undergoing a blast of sufficient strength to exceed momentarily the stall angle by a large amount. This report extends the previously reported low-speed data to the intermediate and high subsonic velocities. A heated shock-driven tunnel was used to provide a high subsonic, steady, free jet of short duration to simulate the model flight. Small high-explosive charges were used to produce scaled blast waves. Generally, the trailing-edge vortices travel at the fluid stream velocities, whereas leading-edge vortices travel at lower speeds. Comparison of a modified Rott theory and vortex data produced by the blast wave alone shows less agreement at the higher velocities than the low-speed data previously reported. The results indicate that the identity of the leading-edge vortex is lost in the presence of the supercritical flow over the wing model. (Author)

AD-274 580 Div. 9
(TISTA/LSK) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION HAVING SPLIT FLAPS LOCATED AHEAD OF THE WING TRAILING EDGE AND LEADING- AND TRAILING-EDGE FLAPS ON THE CANARD CONTROL,
by Bernard Spencer, Jr. Apr 62, 54p. incl. illus. table, 8 refs. (Technical note D-1245)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1245.

DESCRIPTORS: (*Canard configuration, Airplanes, *Split flaps, *Leading edge flaps, Wind tunnel models, Aerodynamics, Subsonic flow, Stability (Lateral), Stability (Longitudinal), Control, Lift, Effectiveness, Model tests.)

The investigation was conducted at low subsonic speeds in the Langley 300-MPH 7- by 10-foot tunnel. The basic wing was trapezoidal in planform with an aspect ratio of 3.0, a taper ratio of 0.143, and a leading-edge sweep of 38.52 degrees. Modifications to the basic wing included deflectable partial-span leading-edge chord-extensions, plain lift flaps located at the trailing edge, and split flaps located forward of the trailing edge. A trapezoidal canard surface similar in planform to the wing, a 60 degrees delta surface and a modified 60 degree delta canard suface were tested in conjunction with the wing. Use of trailing-edge flaps located on the 60 degrees delta and trapezoidal canard surfaces was also investigated as possible longitudinal controls. (Author)

AD-274 581 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
PRESSURE MEASUREMENTS ON TWO 60 DEGREE SWEPT DELTA WINGS WITH BLUNT LEADING EDGES AND DIHEDRAL ANGLES OF 0 DEGREE AND 45 DEGREES AT A MACH NUMBER OF 4.95,
by P. Calvin Stainback. Apr 62, 24p. incl. illus. table, 5 refs. (Technical note D-1246)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1246.

DESCRIPTORS: (*Triangular wings, Swept-back wings, Blunt bodies, Wind tunnel models, Pressure, Load distribution, Supersonics, Model tests.)

An experimental investigation was conducted to measure the pressures on two 60 degree swept delta wings with cylindrical leading edges of 0.25-inch radii and dihedral angles of 0 and 45 degrees. The tests were conducted at a Mach number of 4.95 and a stagnation temperature of 400 F. The test-section unit Reynolds number was 15.19 x 10 to the 6th power and the angle of attack was varied from 0 to 20 degrees. The results of the investigation indicated that, in general, Newtonian theory would not predict the pressure distribution on the model in a plane normal to the leading edge for angles of attack greater than zero. A method which utilizes a linear combination of viscous and inviscid pressure terms, developed by Creager for predicting pressures on blunt-leading-edge delta wing at

angles of attack, was in good agreement with the measured pressure distributions. The stagnation-line pressure level could be predicted within ±9 percent by using the ideal-gas normal-shock relationship with the normal component of the free-stream Mach number. (Author)

AD-274 582 Div. 9, 12, 15
(TISTA/SEB) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
A MATRIX METHOD FOR THE DETERMINATION OF THE NATURAL VIBRATIONS OF FREE-FREE UNSYMMETRICAL BEAMS WITH APPLICATION TO LAUNCH VEHICLES,
by Vernon L. Alley, Jr. and A. Harper Gerringer. Apr 62, 58p. incl. illus. tables, 4 refs. (Technical note D-1247)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1247.

DESCRIPTORS: (*Booster rockets, *Airframes, *Beams, Vibration, Equations, Mathematical analysis, Mathematical prediction, Matrix algebra.)

The equations for determining the undamped natural vibrations of free-free unsymmetrical beams and launch-vehicle structures are developed. The analysis treats a continuous free-free system as an equivalent discrete-mass system of a finite number of degrees of freedom. The flexure-load relationships are equated by influence coefficients which are derived by considering both flexure and deflections from local rotations. Matrix notations are used because of their suitability to the analysis of discrete-mass systems. Equations are developed for the dynamic equilibrium of the system, the natural frequencies and mode shapes and their first derivatives, the bending moments associated with the modes, and the influence coefficients. The results of an investigation on the accuracy of the natural frequencies and mode shapes in terms of the number of discrete masses employed in the solution are also included. The procedures are illustrated by a numerical analysis of a uniform beam, and the application of the matrix procedure to a typical launch vehicle is given. (Author)

AD-274 583 Div. 9
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
HEAT TRANSFER TO 0 DEGREE AND 75 DEGREES SWEPT BLUNT LEADING EDGES IN FREE FLIGHT AT MACH NUMBERS FROM 1.90 TO 3.07,
by Robert L. O'Neal and Aleck C. Bond. Apr 62, 38p. incl. illus. 12 refs. (Technical note D-1256; Supersedes Rept. no. L58A13, AD-153 930)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1256.

DESCRIPTORS: (*Cylindrical bodies, Bodies of revolution, *Wing-body configurations, Swept wings, Wind tunnel models, Supersonics, Hypersonics, *Aerodynamic heating, *Heat transfer, Model tests.)

A flight investigation of a rocket-powered model was conducted to study the heat transfer to wing leading edges in the vicinity of their juncture with a cylindrical body. Heat-transfer data were obtained on leading edges of 3/4-inch diameter at sweep angles of 0 and 75 degrees, Mach numbers from 1.90 to 3.07, and Reynolds numbers based on leading-edge diameter from 8.05 to 11.80 times 10 to the 5th power. The measured heating rates of both the 0 and 75 degrees swept leading edges were of the magnitude predicted by turbulent theory rather than by laminar theory. It is believed that the high level of heating observed on the leading edges was due to the influence of conditions existing in the turbulent boundary layer of the body. Comparison of the average measured heating on the cylindrical portions of both the swept and unswept leading edges indicates that the heating of the unswept segment was generally about twice that of the swept segment. (Author)

AD-274 584 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
HEAT TRANSFER AND PRESSURE DISTRIBUTION AT A MACH NUMBER OF 6.8 ON BODIES WITH CONICAL FLARES AND EXTENSIVE FLOW SEPARATION,
by John V. Becker and Peter F. Korycinski. Apr 62, 29p. incl. illus. 18 refs. (Technical note D-1260; Supersedes Research memo. no. L56F22, AD-104 547)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1260.

DESCRIPTORS: (*Conical bodies, Bodies of revolution, Cylindrical bodies, Wind tunnel models, Hypersonics, Laminar boundary layer, Turbulent flow, Boundary layer, Turbulence, Separation, *Heat transfer, Pressure, Load distribution, Model tests.)

An investigation of heat transfer and pressure distribution on flared bodies under laminar, transitional, and turbulent boundary-layer conditions was conducted in the Langley 11-inch hypersonic tunnel at a Mach number of 6.8. The results indicated extensive zones of separated flow ahead of the flares when the boundary layer was laminar at separation. The rate of heat transfer in these zones was considerably less than in attached laminar flow except in regions where transition occurred on the separated boundary. In the turbulent cases the separated zone was so localized as to be undiscernible in schlieren photographs. Downstream of flow reattachment on the flare, the Stanton number based on local conditions was several times greater for large flare angles than the values existing in attached flow on the body ahead of the flare. The results are analyzed to determine the adequacy of available theoretical methods for predicting heat transfer in cases where the transition point and the limits of the separated zone are known. (Author)

AD-274 585 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF FOREBODY LENGTH ON THE STABILITY AND CONTROL CHARACTERISTICS AT A MACH NUMBER OF 2.01 OF A CANARD AIRPLANE CONFIGURATION WITH A TRAPE-

ZOIDAL ASPECT-RATIO-3 WING,
by M. Leroy Spearman and Cornelius Driver. Apr 62, 30p. incl. illus. tables, 6 refs. (Technical note D-1263; Supersedes memo. 10-14-58L, AD-222 112)

Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1263.

DESCRIPTORS: (*Canard configuration, *Wing-body configurations, Airplanes, Swept wings, Wind tunnel models, Stability (Longitudinal), Control, Effectiveness, Model tests.)

A study was conducted in the Langley 4- by 4-foot supersonic pressure tunnel at a Mach number of 2.01 to determine the stability and control characteristics of a canard airplane configuration equipped with a trapezoidal aspect-ratio-3 wing. Three bodies having length-diameter ratios of 9.45, 11.1, and 12.5 were investigated. The ratio of canard exposed area to wing total area was 0.0707. The model was equipped with a single, swept, body-mounted vertical tail. The experimentally determined variations of control effectiveness and longitudinal stability parameter with canard volume were in reasonably close agreement with estimated variations. As the body length increased, the maximum trimmed values of lift-drag ratio L/D decreased at low stability levels and increased at high stability levels. At low angles of attack, directional stability decreased with increasing body length. With increasing angle of attack, an additional decrease in directional stability occurred because of a decrease in tail contribution which became progressively worse as the body length increased. (Author)

AD-274 586 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMIC CHARACTERISTICS IN PITCH OF SEVERAL RING-WING-BODY CONFIGURATIONS AT A MACH NUMBER OF 2.2,
by Odell Morris. Apr 62, 22p. incl. illus. table, 7 refs. (Technical note D-1272)

Unclassified report

Also available from NASA. Wash. 25, D. C.. as NASA Technical note D-1272.

DESCRIPTORS: (*Ring wings, *Wing body configurations, Wind tunnel models, Aerodynamics, Supersonics, Lift, Drag, Pitch, Moments, Model tests.)

An investigation was conducted in the Langley 4- by 4-foot supersonic pressure tunnel at a Mach number of 2.2 to determine the aerodynamic characteristics of several ring-wing--body configurations. This investigation included tests for the bodies alone and for the ring-wing--body combinations; these tests were conducted through an angle-of-attack range from about -4 to 11 degrees. The data indicated that sizable reductions in body wave drag were obtained for the concave-afterbody configuration as a result of the favorable interference produced by the ring wing. However, a large percentage of the total drag was produced by the ring wing and struts, and thus the ring-wing configurations of these tests appear to offer no drag advantage over a conventional wing-body configuration. Of the three configurations tested, the half-ring wing in combination with a body having a parabolic afterbody had the lowest drag (0.35) and the highest maximum lift-drag ratio (4.9). (Author)

AD-274 587 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
AN INVESTIGATION OF THE NORMAL-FORCE AND VORTEX-WAKE CHARACTERISTICS OF AN OGIVE-CYLINDER BODY AT SUBSONIC SPEEDS,
by Bruce E. Tinling and Clyde Q. Allen. Apr 62, 29p. incl. illus. table, 3 refs. (Technical note D-1297)

Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1297.

DESCRIPTORS: (Cylindrical bodies, *Bodies of revolution, Ogive, Wind tunnel models, Subsonic flow, Load distribution, Interference, *Vortices, Wakes, Model tests.)

An ogive-cylinder body of revolution having a nose section 3 diameters long, tangent to a cylindrical body 7.7 diameters long was tested at angles of attack from 5 to 24 degrees at Mach numbers of 0.3 to 0.95 (Reynolds number of 0.44 x 10 to the 6th power). The effects of a large increase in Reynolds number at a low subsonic Mach number were also studied. These subsonic results supplement those reported in NACA Report 1371 for a similar body at Mach number 1.98 and the same test Reynolds number.

AD-274 588 Div. 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
THEORY OF HIGH-SPEED-IMPACT ATTENUATION BY GAS BAGS,
by John Thomas Howe. Apr 62, 28p. incl. illus. 13 refs. (Technical note D-1298)

Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1298.

DESCRIPTORS: (*Landing impact, *Pneumatic devices, Impact shock, Shock resistance, Shock, Attenuation, Absorption.) (Compression shock, Shock waves, Fluid mechanics, Stresses, Theory, Mathematical analysis.) (Equations of Motion.)

A theory is developed for the one-dimensional motion of a cylindrical gas bag used as an impact cushion. The effect of shock waves in the gas as well as stress in the bag skin is considered. The applicability of the theory to landings both in an atmosphere and on the moon is discussed and the regime of validity of the theory is presented. The use of a series expansion for computing shock-wave properties in the analysis, the strong shock approximation, and the exact shock relations are compared and discussed. The regime of physical parameters for which both the wave model and the series expansion are valid is presented. The method of application of the theory to impact problems is outlined. (Author)

AD-274 589 Div. 9
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMIC CHARACTERISTICS OF A 4-FOOT-DIAMETER

DUCTED FAN MOUNTED ON THE TIP OF A SEMISPAN WING, by Kenneth W. Mort and Paul F. Yaggy. Apr 62, 33p. incl. illus. tables, 5 refs. (Technical note D-1301)

Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1301.

DESCRIPTORS: (*Ducted fans in Wings, Semispan models, Wind tunnel models, Aerodynamics, Moments, Model tests.)

Power, free-stream velocity, and duct angle of attack were varied at several wing angles of attack to define the aerodynamic characteristics of the ducted fan, wing, and of the ducted fan wing together. At large duct angles of attack, the inside of the upstream duct lip stalled causing a rapid change in the duct pitching moments and an accompanying increase in the power required. At low horizontal velocities, this lip stall would probably limit the rate of descent of a vehicle with a wing-tip-mounted ducted fan. During low-speed, level, unaccelerated flight (30 to 80 knots) it appeared that a vehicle, with a configuration similar to that examined, would require less power if it were supported by a wing and ducted fans than if it were supported only by ducted fans. (Author)

AD-274 612 Div. 9
(TISTA/WAW) OTS price $5.60

Stanford U., Calif.
A THEORY OF ASYMMETRIC HYPERSONIC BLUNT-BODY FLOWS,
by Rudolph J. Swigart. Jan 62, 53p. incl. illus. table, 13 refs. (Rept. no. SUDAER no. 120)
(Contract AF 49(638)965)
(AFOSR TN 62-2232) Unclassified report

DESCRIPTORS: (*Blunt bodies, Hypersonics, Supersonics, Aerodynamics, *Shock waves, Mathematical analysis, Series, Integral equations, Differential equations, Theory.)

The problem of supersonic and hypersonic flow past blunt bodies at small angles of attack is considered. Two-dimensional asymmetric as well as three-dimensional flow is analyzed. The method of analysis is an inverse one, that is, the shock-wave shape and free stream conditions are known, and the corresponding body shape and flow field are determined. Solutions at zero angle of attack are obtained as a special case of the general problem. Results at zero angle are obtained for shock waves that are portions of circles, parabolas, spheres, and paraboloids of revolution at a free stream Mach number of infinity and ratio of specific heats of 1.4. Results are obtained for parabolic and paraboloidal shock waves at small angle of attack and infinite free stream Mach number. A symmetrical shock wave at angle of attack is produced by a body that is asymmetric to the shock axis of symmetry. However, a conic section may be fitted to the converged body shape out to the sonic point. This is done for the third-truncation body that produces a parabolic shock at angle of attack of 10 degrees. The body is closely approximated by a prolate ellipse at angle of attack of 14.2 degrees. (Author)

AD-274 625 Div. 9
(TISTA/WAW) OTS price $1.60

University of Southern Calif. Engineering Center, Los Angeles.
SUPERSONIC WIND TUNNEL TESTS ON EXPERIMENTAL STATIC PRESSURE PROBES,
by Walter P. Rehm. 31 Jan 62, 18p. incl. illus. table (USCEC rept. no. 65-39)
Unclassified report

DESCRIPTORS: (*Flight instruments, Measurement of Pressure.) (*Pitot tubes, Supersonics, Aerodynamics, Model tests, Wind tunnel models.)

AD-274 650 Div. 9
(TISTP/FR) OTS price $4.60

CryoVac, Inc., Columbus, Ohio.
CRYOPUMPING BY THREE ARRAYS AT PRESSURES OF 10-3 TO 10-8 mm. Hg.,
by Carlisle B. Barnes, Jr. and Charles B. Hood, Jr. Dec 61, 40p. incl. illus. tables, 8 refs.
(Subcontract to Stevens Co., Newport, Ky., Contract AF 33(616)5102)
(ASD TDR 62-15) Unclassified report

DESCRIPTORS: (Gases, Condensation, *Cryogenics, Gas pumps, *Vacuum systems.) (Liquefied gases, Nitrogen.) Ionization gages.

Three arrangements of surfaces cooled to 21.5 K were investigated theoretically and tested to determine condensing rates and resultant vacuum pumping performance of the arrays at pressures of 1/1000 to 10 to the -8 mm Hg. These are identified as unshielded, flat shielded, and angled fin arrays. Theoretical performance and experimental performances were correlated. Measurement of vacua below 1/10,000 mm Hg. were shown to be of uncertain accuracy. (Author)

AD-274 667 Div. 9, 30
(TISTA/WAW) OTS price $2.60

Johns Hopkins U., Baltimore, Md.
THE ORIFICE-HOT-WIRE PROBE AND MEASUREMENTS OF WALL PRESSURE FLUCTUATIONS.
Rept. on A Cooperative Program of Fundamental Research as Related to Jet Propulsion,
by C. J. Remenyik and L. S. G. Kovasznay. Apr 62, 15p. illus. table, 12 refs. (Proj. Squid technical rept. no. JHU-21-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., Contract Nonr-185825, Proj. NR-098-038)
Unclassified report

DESCRIPTORS: (*Wind tunnels, Wind tunnel models, Supersonics, Aerodynamics, Turbulent boundary layer, Noise, Pressure, Instrumentation, Oscillation, Orifices, *Wire.)

Difficulties and limitations concerning existing techniques prompted the development of a hot-wire device adapted to measure pressure fluctuations at the solid boundaries of flows. The device consists of a small orifice on the boundary and it is continued in a capillary tube so that there is no discontinuity in the inside walls. The sensing element is a hot-wire spanning the cross section of the hole near the orifice. The other end of the capillary is connected to a constant pressure source that is slightly below the mean pressure at the wall to create a slow bias flow to render the hot-wire response linear to veloc-

ity fluctuations. Pressure fluctuations at the wall are converted into velocity fluctuations at the hot wire. When the capillary tube is made long enough, waves reflected from the other end are damped out and the hot-wire signal follows faithfully the pressure fluctuations. One important advantage of the device is that mechanical vibrations of the wall do not produce parasitic signals. (Author)

AD-274 748 Div. 9, 10, 25, 27, 4
(TISTA/EJH) OTS price $9.60

James Forrestal Research Center, Princeton U., N. J.
PROJECT SQUID: A COOPERATIVE PROGRAM OF FUNDAMENTAL RESEARCH AS RELATED TO JET PROPULSION.
Semi-annual progress rept., 1 Oct 61-31 Mar 62. 1 Apr 62, 108p. incl. illus. tables, refs.
(Contract Nonr-185825)
Unclassified report

DESCRIPTORS: (*Fluid mechanics, Gases, Particles, Mixtures, *Gas flow, Gas ionization, Magnetohydrodynamics, *Plasma physics, Plasma jets, Thermodynamics, *Reaction kinetics, Kinetic theory, Chemical reactions, Surfaces, Catalysis.) (Aluminum, Solid rocket propellants, *Combustion, Flares.) *Jet propulsion, Recombination reactions.

Contents: Fluid mechanics: Nonsteady and nonequilibrium flow; Turbulence. Transport and transfer processes: The dynamics of gases and plasmas; Thermodynamic and transport properties of gases at high temperatures and pressures; Two-phase flow; Thermal conductivity of gases and liquids over a range of temperatures and pressures; Fluid flow with suspended particles. Chemical kinetics: Kinetics of elementary reactions; Reaction kinetics in high-temperature gases; High-temperature reactions; Chemical kinetics and gas dynamics of surface-catalyzed atom and free-radical reactions; Inelastic molecular collisions. Combustion phenomena: Solid-propellant flame mechanisms; Thermal conductivities of gases at high temperatures; Magnetohydrodynamics of partially ionized gases; Fluctuations in plasma jets; Flame structure and burning characteristics of high energy fuels and oxidizers; Plasma flow in nozzles.

AD-274 761 Div. 9
(TISTP/TL) OTS price $2.60

Centre National d'Etudes et de Recherches Aeronautiques, Brussles (Belgium).
ON THE EXISTENCE OF CROSS FLOWS IN SEPARATED SUPERSONIC STREAMS.
Rept. on Laminar Separation in Supersonic Flow, by Jean J. Ginoux. Feb 62, 19p. incl. illus. 9 refs. (Rept. no. TCEA TN 6)
(Contract AF 61(052)350)
Unclassified report

DESCRIPTORS: (*Supersonic flow, Cross flow, Laminar boundary layer, Turbulent flow, Pressure, Measurement, Vortices.) (Wind tunnels, Tests of Model configuration.)

An experimental investigation was made on laminar separated supersonic streams using two-dimensional backward-facing step models. It was shown that a cross-flow existed in the separated region of the flow which is associated with the side wall boundary-layers. Its effect is to decrease the base pressure and increase the pressure gradient at reattachment even for large values of the model-span to step-height ratio. It is shown that the commonly accepted assumption that a two-dimensional flow exists when there is no measurable spanwise pressure variation is a necessary but not sufficient condition. In the turbulent case, it is generally found that the measured base pressure is lower than is theoretically predicted. This is explained by the existence of a cross-flow (suction) produced by strong vertical vortices near the side walls. (Author)

AD-274 762 Div. 9
(TISTP/TL) OTS price $3.60

Centre National d'Etudes et de Recherches Aeronautiques, Brussels (Belgium).
EFFECT OF GAS INJECTION IN SEPARATED SUPERSONIC FLOWS.
Final rept.,
by Jean J. Ginoux. Feb 62, 12p. illus. 12 refs.
(Rept. no. TCEA TN 7)
(Contract AF 61(052)350)
Unclassified report

DESCRIPTORS: (*Supersonic flow, *Gases, Air and Freon Injection into *Laminar boundary layer and *Turbulent boundary layer, Pressure, Measurement at Mach number.) (Wind tunnels, Tests of Model Configurations.)

An experimental investigation has been made at a Mach number of 2.21 on the effect of air injection in separated supersonic flows using two-dimensional backward facing step models. This effect, in a laminar flow, was found to be independent of the particular technique of injection when the rate of injection was small. Air injection raises the base pressure and decreases the pressure gradient at reattachment. At high rates of injection, considerable differences are found between the results obtained for various techniques of injection. It was also shown that the increase of the base-pressure is larger in the turbulent case than for a laminar boundary layer. When freon gas was injected, it produced the opposite effect, namely of decreasing the base-pressure at low rates of injection. (Author)

AD-274 781 Div. 9, 15
(TISTP/MFA) OTS price $3.60

Frankford Arsenal, Philadelphia, Pa.
DIFFUSION IN EXPANDING ELECTRICALLY NEUTRAL GASES WITH LARGE PRESSURE GRADIENTS. PART I. DEVELOPMENT OF MATHEMATICAL MODEL,
by D. J. Katsanis. Oct 61, 30p. (Memo. rept. no. M62-4-1)
(DA Proj. 59925001)
Unclassified report

DESCRIPTORS: (*Thermodynamics, *Irreversible processes, *Fluid mechanics, Gases, Diffusion, Pressure, Physical chemistry.) (*Kinetic theory, Entropy, Gas flow.) (*Mathematical analysis, Partial differential equations.)

A study was conducted to determine the mathematical form of the theory for unsteady diffusion processes in terms of specifically related physical concepts, mainly those of mechanics and thermodynamics. A mathematical model was developed for unsteady rapid expansion of a nonreacting binary inviscid mixture of perfect gases in which diffusion occurs. The analysis is based on Prigogine's method, which utilizes

the concept of generalized flow. The derived equations depend on influence coefficients which can be related to a diffusion coefficient. Since the derivation is limited to macroscopic concepts, any diffusion which results in a macroscopically measurable change in gas mixture composition is admissible, whether it be molecular or turbulent. The final form of the model is similar to those of Prigogine, Chapman and Cowling, or DeGroot. However, the diffusion coefficient as discussed is slightly different and chemical reactions are excluded. (Author)

AD-274 803 Div. 9
(TISTP/MFA) OTS price $2.60

Douglas Aircraft Co., Inc., Santa Monica, Calif.
FLOW OF A COMPRESSIBLE FLUID IN AN ACCELERATING NOZZLE,
by J. C. Wu and L. Pottsepp. 6 Apr 62, 19p. incl. illus. 2 refs. (Rept. no. SM-38824)
Unclassified report

DESCRIPTORS: (*Compressible flow, Fluids, *Nozzles, Magnetohydrodynamics.) (Gas flow, Acceleration, Deceleration, Thrust, Velocity, Pressure, Temperature.) (Perturbation theory, Partial differential equations.)

The problem of one-dimensional, steady, adiabatic flow in an accelerating nozzle moving with a constant axial acceleration relative to an inertial frame of reference is analyzed. It is shown that acceleration in the direction opposite to that of the flow in the nozzle produces an effect similar to that obtained by slightly increasing the cross section area of the nozzle with downstream distance. Antithetically, acceleration in the direction of the flow produces an effective decrease in the nozzle cross section area. (Author)

AD-274 782 Div. 9, 25
(TISTP/MFA) OTS price $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
(No title).
Final rept.,
by T. Y. Li. Jan 62, 6p. 11 refs. (Rept. no. TR AW 6203)
(Contract AF 49(638)977)
(AFOSR-2049) Unclassified report

DESCRIPTORS: (*Hydrodynamics, Stability in *Dissociation of *Gases.) (Hypersonics, Gas flow and Vortices, Sheets, Blunt bodies, Conical bodies, Wedges, Cylindrical bodies.)

The stability of a plane vortex sheet, between two uniform streams of dissociating gases, with respect to small disturbances is examined on the basis of a linearized theory. The effects of equilibrium dissociation are destabilizing to the vortex sheet flow. In a nonequilibrium flow, the vortex sheet is shown to be always unstable. (Author)

10. FUELS AND COMBUSTION

AD-274 591 Div. 10
(TISTA/SEB) OTS price $1.60

Princeton U., N. J.
BURNING RATE CONTROL FACTORS IN SOLID PROPELLANTS.
Quarterly technical summary rept. nos. 11 and 12, 1 July-31 Dec 61,
by Kimball P. Hall, Joseph Wenograd, and Richard Cole. 31 Mar 62, 10p. illus. 3 refs. (Aeronautical engineering rept. nos. 446 k and l)
(Contract Nonr-185832, Proj. NR 098-201)
Unclassified report

DESCRIPTORS: (*Solid rocket propellants, Propellant grains, *Combustion, Flames, Pressure, Temperature, Measurement, Theory, Tests, Photographic analysis, Photography.) Thermocouple pyrometers, Thermocouples, Binders, Polymers, Butadienes, Acrylic resins, Sulfides, Ammonium radicals, Perchlorates, High pressure research.

Burning rate measurements for six propellants were completed over a pressure range from 30 to 20,000 psia. All six of the propellants studied displayed relatively low pressure indices of about one-third to one-half over the pressure range up to 2,000 psia but displayed extremely high pressure dependency with exponents of the order of unity or greater for all pressures above 5,000 psia. Photographic studies were conducted of the burning surface of the propellant during actual burning with high optical resolution. It was found possible to photograph the burning surface using electronic flash as illumination source at 1/1000th second exposure and at a magnification on the film of 5X, with a satisfactory depth of focus. The flame zone is being studied by use of ultrafine thermocouples, imbedded in the propellant strand in a fashion such that the temperature-time history of a station in the burning strand may be resolved as the flame approaches and consumes the propellant at that station. (Author)

AD-274 620 Div. 10
(TISTM/EJH) OTS price $11.00

Shell Oil Co., Wood River, Ill.
COMBUSTION CHARACTERISTICS OF SPECIAL HYDROCARBON JET FUELS.
Rept. for 1 May 58-31 Oct 60, on Aviation Fuels,
by W. W. Horstman, J. L. Jackson and others.
Nov 60, 137p. incl. illus. tables, 6 refs.
(Contract AF 33(616)5662, Proj. 3048; In cooperation with Shell Development Co., Emeryville, Calif.)
(WADD TR 60-850) Unclassified report

DESCRIPTORS: (*Jet engine fuels, Gas generator engines, Aircraft, Supersonic planes, Ignition, *Combustion, Flames, Exhaust gases, Fluid flow, Physical properties, Stability, Test equipment, Combustion chambers, Test methods, Infrared spectroscopy.) (Hydrocarbons, Cyclohexanes.)

The combustion performance of potential hydrocarbon fuels for supersonic aircraft jet engines was evaluated in a J-79 engine combustor. The combustor test conditions simulated full-scale engine operation at high altitudes and supersonic speeds. As the inlet air pressure decreased, the combustion efficiency decreased. Differences in

combustion efficiency were noted between 8 fuels at the various operating conditions. A comparison of the fuel flow requirement for a constant burner temperature rise (thrust) at two test conditions indicated lowest fuel flow on a weight basis for a paraffinic fuel and a production type JP-6 fuel; lowest fuel flow on a volume basis was indicated for a naphthenic fuel and isopropylbicyclohexyl. At a more severe operating condition the isopropylbicyclohexyl indicated a low fuel flow requirement on both a weight and volume basis. The effect of fuel preheat on combustion efficiency was negligible. Combustor liner temperatures were not affected appreciably by fuel differences. The carbon deposits were very light for all fuels. The fuels with the higher ASTM initial and 10% boiling points had higher ignition requirements at simulated altitude relight test conditions. (Author)

AD-274 623 Div. 10
(TISTA/SEB) OTS price $15.00

Inglewood Lab., Thompson Products, Inc., Calif.
STUDY OF PHYSIOCHEMICAL PROPERTIES OF SELECTED MILITARY FUELS.
Rept. for Feb 55-Dec 58 on Aviation Fuels,
by E. Findl, H. Brande, and H. Edwards. Dec 60, 216p. incl. illus. tables, 38 refs.
(Contract AF 33(616)3729, Proj. 3048)
(WADD TR 60-767) Unclassified report

DESCRIPTORS: (*Aviation fuels, *Jet engine fuels, *Rocket fuels, Physical properties, Chemical properties, Thermodynamics, Handbooks.) (Solubility of Air, Nitrogen, Ethanes.) (Hydrocarbons, Naphthalenes.) Viscosity, Density, Specific heat, Enthalpy, Entropy, Vaporization.

Physical and thermodynamic properties were studied for MIL-F-5624C Grade JP-4, a MIL-F-25558 Grade RJ-1, MIL-F-25656 Grade JP-6-H, and Decalin, a commercial hydrocarbon mixture of the cis and trans isomers of decahydronapthalene. Properties evaluated were: Equilibrium solubility of air, nitrogen and ethane in the JP-4 and RJ-1 fuels; effect of dissolved air, nitrogen, and ethane on the viscosity of the JP-4 and RJ-1 fuels; effect of dissolved ethane on density of the JP-4 and RJ-1 fuels; effect of pressure level, agitation rate, and rate of pressure change on the evolution rate of air and ethane from the JP-4 and RJ-1 fuels; thermodynamic properties of each of the four test fuels including specific heats, enthalpy, and entropy; vaporization characteristics of each of the test fuels including vapor pressure, equilibrium vaporization curves, minimum reflux curves, variation of vapor molecular weight during minimum reflux distillations, and variation of density during minimum reflux distillations for the 4 fuels; variation of liquid density as a function of temperature; and literature survey correlation compilation for the determination of physical and thermodynamic properties of petroleum fuels. (Author)

AD-274 624 Div. 10
(TISTA/SEB) OTS price $8.10

Utah U., Salt Lake City.
IGNITION AND COMBUSTION OF SOLID PROPELLANTS.
Final technical rept., Mar 57-30 Sep 61,
by Rex C. Mitchell, John A. Keller and others.
30 Sep 61, 76p. incl. illus. tables, 13 refs.
(Contract AF 49(638)170)
(AFOSR-2225) Unclassified report

DESCRIPTORS: (*Solid rocket propellants, *Propellant grains, Temperature, Pressure, *Ignition, Flames, *Combustion, Flame propagation, Theory, Tests, Mathematical analysis, Equations.) Shock tubes.

The response was studied of propellant ignition to externally supplied heat flux. Both radiant flux from electrically heated tube furnaces and convective flux from shock-heated gas were employed, the former giving fluxes in the range 5 to 50, the latter, 100 to 300 Btu per sec., sq. ft. The results, ignition delay time as a function of heat flux are correlated. The theory predicts the effect of initial propellant temperature on the ignition time-heat flux relationship, but is noncommittal with respect to the effect of pressure. The effect of pressure on the ignition delay time of perchlorate propellants is a function of heat flux level, being very slight, for the propellants studied, at flux levels above 20 Btu per sec., sq. ft. Exploratory studies concerned flame spread, effects of aerodynamic transients on burning propellant, and the diffusion flame between large bodies of fuel and oxidant. One firm conclusion is that flame spread across fresh surface, unassisted by external heat flux to that surface, is too slow to be an important factor in the over-all ignition process. As one aspect of the aerodynamic transient studies, a theory of the rarefaction tube was developed. (Author)

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

12. GUIDED MISSILES

AD-274 476 Div. 12, 2
(TISTA/VGW) OTS price $2.60

General Dynamics/Convair, San Diego, Calif.
USING SUB-SATELLITES TO SENSE YAW MOTION IN ORBIT,
by J. F. Farrell. Nov 61, 20p. incl. illus.
5 refs. (Rept. no. ERR-SD-146)
Unclassified report

DESCRIPTORS: (*Satellite attitude, Yaw, Detection by Ejection of Satellite vehicles from *Satellite vehicles, *Celestial mechanics, Perturbation theory.)

A technique is outlined to obtain a yaw attitude reference in an orbiting satellite. The method described uses a small, actively ratiating subsatellite (bunny satellite) which is ejected with a small velocity increment from the main satel-

lite. This report describes the relative motion between the bunny and the satellite for velocity increments added in various directions as well as for perturbations in radial position at ejection. Influences on the relative position such as ejection errors, effect of tension or compression forces, relative gravitational attraction, gravity gradient effects, and precession effects are discussed. (Author)

AD-274 505 Div. 12
(TISTB/AW) OTS price $1.60

Aerospace Corp., El Segundo, Calif.
BIBLIOGRAPHY OF REPORTS.
Rept. for 1 July-31 Dec 61,
comp. by Barbara H. Tripoli. 10 Jan 62, 14p.
(Rept. no. CSR-930(9990)BR-1, supersedes AD-267 177)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (*Bibliography, Reports, *Guided missiles, Guided missile boosters, Spaceships.) (Magnetohydrodynamics, Electromagnetic waves, Fluid mechanics.) (Beryllium compounds, Oxides.) Propellants, Countermeasures, Aerodynamics.

AD-274 561 Div. 12
(TISTB/AW) OTS price $5.60

Naval Ordnance Lab., Corona, Calif.
BIBLIOGRAPHY OF TECHNICAL REPORTS ISSUED BY THE NAVAL ORDNANCE LABORATORY, CORONA, THROUGH 31 DECEMBER 1961.
15 Mar 62, 58p. (Supersedes NOLC rept. no. 465, AD-314 227)
(NAVWEPS rept. 7218, supersedes NAVORD rept. no. 5964, AD-314 227)
Unclassified report

DESCRIPTORS: (*Bibliography, *Guided missiles.) (*Radar, *Radar antennas, Radar antijamming, Radar deception, Radar jamming, Countermeasures, Radar tracking.) (Infrared photoconductors, Photoelectric materials, Detection.) *Guided missile fuzes, Ferroelectric materials, Scientific research, Chemistry, Polymers.

This bibliography lists all formal technical publications issued by the Laboratory from Sep 53 through 31 December 1961. Although other technical documents, chiefly progress and interim reports, are published at the Laboratory, only formal reports bearing NOLC, NAVORD, or NAVWEPS numbers are included. (Author)

AD-274 568 Div. 12, 30
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
THE DEVELOPMENT OF THE ELECTRIC FIELD METER FOR THE EXPLORER VIII SATELLITE (1960),
by Thomas W. Flatley and Harold E. Evans. Apr 62, 35p. incl. illus. tables. (Technical note D-1044)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1044.

DESCRIPTORS: (*Satellite vehicles, Instrumentation, *Electrometers for Measurement of Electrostatic fields, Ions, Plasma physics.)

The electric field meter (EFM) was one of the sensors flown in the Explorer VIII satellite launched on November 3, 1960. The EFM, located on the spin axis of the payload, was designed to measure the strength of the electrostatic field caused by the ion sheath surrounding the satellite. Since the sensor required dc motor elements to operate in an ionospheric vacuum, methods were sought to avoid the catastrophic wear rate of standard commercial commutator brushes and ball bearings in a vacuum environment. After an extensive test program, gold-plated stainless steel ball bearings and carbon brushes with a molybdenum disulphide core lubricant were used in the EFM flight units. By using these special components, an EFM was developed with a life expectancy exceeding that of the battery power available. (Author)

AD-274 579 Div. 12
(TISTA/LSK) OTS price $1.75

National Aeronautics and Space Administration, Washington, D. C.
DESIGN OF THE NASA LIGHTWEIGHT INFLATABLE SATELLITES FOR THE DETERMINATION OF ATMOSPHERIC DENSITY AT EXTREME ALTITUDES,
by Claude W. Coffee, Jr., Walter E. Bressette, and Gerald M. Keating. Apr 62, 63p. incl. illus. tables, 24 refs. (Technical note D-1243)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-1243.

DESCRIPTORS: (*Satellite vehicles, Pneumatic devices, Spheres for Determination of Upper atmosphere, Atmosphere, Density from Life expectancy.) (Polymers, Ethylenes.) (Aluminum, Foils.)

A design study was made of the characteristics of inflatable spheres for use as satellites for determining atmospheric density. The spheres could be fabricated from lightweight material, compactly folded, and inflated to give a large frontal area. The temperature of the inflatable sphere while in a sunlight orbit could be controlled by coating the outside surface of the sphere. A 12-foot-diameter inflatable sphere was successfully injected into orbit and named Explorer IX (1961 Delta 1). The inflatable satellite is optically visible and appears to reflect more like a specular sphere than a diffused sphere. Radar sightings of the satellite have indicated that the 12-foot-diameter satellite is fully inflated. (Author)

AD-274 641 Div. 12
(TISTA/SEB) OTS price $9.60

Radio Corp. of America, Camden, N. J.
STUDY OF INSTRUMENTATION AND TECHNIQUES FOR MONITORING VEHICLE AND EQUIPMENT ENVIRONMENTS AT HIGH ALTITUDES. VOLUME II. EFFECTS OF HIGH-ALTITUDE ENVIRONMENTS ON VEHICLES AND EQUIPMENT. Final rept. on Crew and Vehicle Environmental Data Sensing and Instrumentation,
by B. V. Wacholder and E. Fayer. June 60, 98p. incl. illus. 77 refs.
(Contract AF 33(616)6407, Proj. 8223)
(WADC TN 59-307, Vol. 2)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, *Spaceships, *Hypervelocity vehicles, Lunar vehicles, Hazards to High altitude, *Space environmental conditions, Upper atmosphere.) (Pressure, Density, Temperature, Solar energy, Electromagnetic waves, Cosmic rays, Van Allen radiation belt, Plasma physics, Aurorae, Magnetic fields, Terrestrial magnetism.) (Airframes, Materials, Plastics, Ceramic materials, Organic materials, Metals, Alloys, Control systems, Electronic equipment, Electrical equipment, Communication systems, Auxiliary power plants, Closed-cycle ecological systems.) (Shock, Aerodynamic heating, Meteorites.)

Environments are presented which were determined to be deleterious to the vehicle. A chart is presented which indicates which of the environments affects the various materials and subsystems. An analysis was made of the effects of the environments on such materials as metals, plastics, ceramics, elastomers, surface coating materials, lubricants, and hydraulic fluids. An analysis was made of the environmental effects on vehicle subsystems taken from the X-15, Dyna-Soar, and Mercury Systems. The subsystems are typical of those to be used in future high altitude vehicles. The subsystems analyzed are structure, flight control, communications, environmental control, escape, and auxiliary power units. (Author)

13. INSTALLATIONS AND CONSTRUCTION

AD-274 474 Div. 13, 10
(TISTB/AW) OTS price $3.60

General Electric Co., Philadelphia, Pa.
HUMAN-FACTORS ENGINEERING CONSIDERATIONS IN HANDLING HYPERGOLIC PROPELLANTS,
by H. T. Fisher and E. M. Coluzzi. 16 Apr 62, 40p. incl. illus. tables, 9 refs. (Document no. 62SD498)
Unclassified report

DESCRIPTORS: (*Liquid rocket propellants, Handling, Hazards, Toxicity, Toxic agent alarms, Decontamination, Decontamination kits, Protective clothing, Training.) (Hydrazines, Nitrogen compounds, Oxides.)

This document attempts to provide accurate and timely data and information concerning methods, techniques, and equipment in the handling of hypergolic propellants. The information could be used to provide data necessary for the generation of Aerospace Ground Equipment (AGE) design criteria for support of an orbiting-type vehicle. Included are: problems encountered in the handling of hypergolic propellants, propellant characteristics and associated hazard and health problems, identification of equipment used in handling propellants, specification of propellant handling methods, and determination of training requirements and equipment. (Author)

AD-274 590 Div. 13, 12
(TISTW/DLW) OTS price $3.60

Ordnance Mission, White Sands Missile Range, N. Mex.
NIKE-HERCULES. AIR CONDITIONING AND COLLECTIVE PROTECTION SYSTEM FOR NIKE-HERCULES LOW-TEMPERATURE TESTS,
by Archie R. Beckett. Apr 62, 28p. incl. illus. tables (Technical memo. no. 977)
Unclassified report

DESCRIPTORS: (Guided missiles, Surface to air, Command systems, Control systems, *Combat information centers, Radar stations, Display systems, Ground support equipment, *Air conditioning equipment, Air, *Particulate filters, Effectiveness, Tests.) (Air conditioning equipment, Temperature, Low temperature research, Tests, *Radar trailers.)

The results are described of ambient and low-temperature engineering tests on an Air Conditioner-Collective Protection (AC-CP) system operated with a Nike-Hercules radar control van. The AC-CP is designed to provide the Nike-Hercules vans with a means of air filtration against chemical, biological, and radiological (CBR) warfare attack and an air conditioner for removing heat in the van personnel section. The AC-CP and the radar van were tested at four environmental air temperatures: (1) +75 F, (2) -40 F, (3) -65 F, and (4) +83 F. (Author)

AD-274 646 Div. 13, 20, 22
(TISTE/NTM) OTS price $9.10

American Machine and Foundry Co., Greenwich, Conn.
A STUDY OF BLAST-CLOSURE DEVICES.
Final rept.,
by J. Kessler and L. Levoy. Feb 62, 193p. incl. illus. tables, 30 refs.
(Contract AF 29(601)4354, Proj. 1080)
(AFSWC TDR 62-10) Unclassified report

DESCRIPTORS: (*Blast on *Structures, *Underground structures, *Shelters, *Pressure, Load distribution, Analysis.) (*Nuclear weapons, Nuclear explosions, Atomic bomb explosions, Radiation effects, Thermal radiation, Orifices, Propagation, Wave transmission, *Shock waves, Attenuation, Pressure.) (*Valves, *Pneumatic valves, *High pressure valves, *Safety valves, Hydraulic valves.) Guided missiles.

The investigations and analyses accomplished during the study of blast-actuated blast-closure systems are presented. The objective was to survey the state of the art of blast-closure system design and to establish criteria for the formulation of development and design procedures and techniques. The initial effort was devoted to a state of the art survey, after which work was started concurrently on the establishment of blast-closure system criteria and on studies of blast attenuation in tunnels affected by 90 degrees bend, orifices, plenums, etc. In addition to the definition of satisfactory closure systems, a selection of optimum configurations for particular overpressure ranges and types of installations was made. The results of this study indicate that only one valve has been designed for the maximum operating pressure specified and it is therefore concluded that additional effort should be expended to produce additional blast-closure concepts. (Author)

AD-274 825 Div. 13, 2, 17
(TISTE/CDM) OTS price $28.50

Missouri School of Mines and Metallurgy, Rolla.
GEOLOGIC STRUCTURE STABILITY AND DEEP PROTECTION CONSTRUCTION,
by G. B. Clark and R. D. Caudle. Nov 61, 619p. incl. illus. tables, refs.
(Contract AF 29(601)2821, Proj. 1080)
(AFSWC TDR 61-93) Unclassified report

DESCRIPTORS: (*Underground structures, *Shelters, Safety, Stability and *Geology.) (Physical properties, Mechanical properties, Failure (Mechanics) of *Rocks, Soils.) (*Geological survey for Underground structures, Stresses, *Mining engineering, Design, Mathematical analysis, Construction, Engineering, Structures.) (*Geophysical prospecting, Theory, Test methods.) (*Shock waves, *Seismic waves, Propagation, Attenuation, Measurement, Instrumentation.) Nuclear explosions.

A study is made of the problems associated with protective construction in rock, particularly deep protective structures. Information from the experience of mining engineers and from past weapons tests is given on rock structure and properties and on theories relating these to the stability of underground openings under both static and dynamic loads. Recommendations are made for meeting design problems for underground protective structures and for research to improve the reliability of the designs. (Author)

14. MATERIALS (NON-METALLIC)

AD-274 518 Div. 14, 20
(TISTM/GEC) OTS price $4.60

General Dynamics/Fort Worth, Tex.
EFFECTS OF REACTOR RADIATION ON THE PROPERTIES OF MIX BIS (PHENOXYPHENYL) ETHER OPERATING IN A HYDRAULIC PUMP LOOP,
by E. C. Shellhase, R. H. McDaniel, and F. A. Haley. 30 Mar 62, 46p. incl. illus. tables, 8 refs. (Document no. NARF-62-3T: MR-N-292)
(Contract AF 33(657)7201)
Unclassified report

DESCRIPTORS: (*Hydraulic fluids, *Phenyl radicals, *Oxygen compounds, *Ethers.) (Tests, *Radiation effects, Neutron bombardment, Gamma rays, Test methods, Stability, Oxidation, Corrosion.)

An experimental hydraulic fluid, mix bis(phenoxyphenyl) ether, was irradiated under operational environmental conditions imposed by a hydraulic pump loop. A ground test reactor was used to provide a mixed neutron-gamma radiation field. The fluid was exposed to an average dose of 2.7 x 10 to the 10th power ergs/gm(C) of gamma radiation and 3.9 x 10 to the 15th power nvt of neutrons. Pump-loop conditions during irradiation were 3000 psi and 4-gpm flow. Bulk-oil temperature ranged from 326 to 340 F. A pre-irradiation control evaluation was conducted with the pump loop operating 9.75 hr and bulk-oil temperature ranging from 350 to 380 F. The results of property and performance tests conducted on samples of the fluid during irradiation were compared to data on the nonirradiated fluid to assess the radiation damage. (Author)

AD-274 533 Div. 14, 27
(TISTM/EJH) OTS price $3.60

Atlantic Research Corp., Alexandria, Va.
DEVELOPMENT OF FLEXIBLE POLYMERS AS THERMAL INSULATION IN SOLID-PROPELLANT ROCKET MOTORS.
Quarterly progress rept., 1 Jan-31 Mar 62,
by N. Vasileff, T. Walton, and J. Duffy. Apr 62, 26p. incl. illus. tables.
(Contract DA 36-034-ORD-3325)
Unclassified report

DESCRIPTORS: (*Rocket motors, Solid rocket propellants, *Thermal insulation, Materials, Binders, *Heat resistant polymers, *Composite materials, Silicone resins, *Epoxy resins, *Phenolic resins, Asbestos fibers, Reinforcing materials, Mechanical properties, Tests, Aging.) (Phthalic anhydrides, Anhydrides, Furan, Cyanamides, Cyanuric acid, Esters, Heterocylic compounds, Resins, Castor oil.)

The purpose of this project is to develop flexible polymers, which, when combined with appropriate fillers, will be suitable for use as thermal insulation in solid-propellant rocket motors. During the report period, efforts were concentrated on: (1) the internal flexibilization of epoxy, melamine, and furan resins, (2) the investigation of other fillers besides asbestos fibers, (3) mechanical testing of aged, externally plasticized epoxy resins, (4) oxyacetylene torch testing of filled epoxy resins, and (5) static motor testing of filled flexible phenolic resins. (Author)

AD-274 560 Div. 14, 25
(TISTM/BRW) OTS price $.50

Naval Research Lab., Washington, D. C.
MAXIMUM STRAINS IN THE RESIN OF FIBERGLASS COMPOSITES,
by J. A. Kies. 26 Mar 62, 12p. incl. illus tables (NRL rept. no. 5752)
Unclassified report

DESCRIPTORS: (*Composite materials, *Laminates, Plastics, Glass textiles, Fibers, Reinforcing materials, *Resins, Deformation, Crazing, Mathematical analysis, Stresses.)

A simple analysis was made of models representing possible conditions in glass-fiber-reinforced plastics. The analysis shows that for strains imposed in a direction transverse to a set of windings, the ratio of tensile strain in the resin to the average measured strain can approach E sub g/E sub r as the resin content is decreased to the limit for filling the interstices, where E sub g and E sub r are Young's modulus for glass and resin, respectively. For shear strains the maximum strain concentration in the resin can be as high as 0.7 G sub g/G sub r, where G sub g and G sub r are the shear moduli of glass and resin. Measured average strains in service are as high as two percent. The strain in the resin in a direction transverse to the fibers is correspondingly about 40%. No resin in ordinary structural use can stand this strain without cracking. (Author)

AD-274 642 Div. 14, 17
(TISTP/AW) OTS price $7.60

Aerospace Corp., El Segundo, Calif.
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY,
comp. by Theodore Cheron. 1 Jan 62, 62p.

163 refs. (Rept. no. TDR-930(2240-01)TN-2)
(Contract AF 04(647)930)
(DCAS TDR 62-5) Unclassified report

DESCRIPTORS: (*Bibliography, *Crystals, Growth, Preparation, Lasers.) (*Garnet, *Ruby, *Corundum, *Spinels, Sapphires, Ferrites, Metallic compounds, Aluminum compounds, Oxides, Refractory materials.) (Crystal structure, Spectrographic analysis.)

This bibliography, consisting of 163 entries, covers the period from 1950 to 1961. It reviews the literature on the preparation of crystals for lasers, covering magnetic and non-magnetic garnets, rubies, crystallography, and high-melting metal oxides. (Author)

AD-274 654 Div. 14, 25
(TISTM/EJH) OTS price $3.60

General Electric Co., Cincinnati, Ohio.
CARBONIZATION OF PLASTICS AND REFRACTORY MATERIALS RESEARCH PROGRAM. VOLUME II. REFRACTORY MATERIALS RESEARCH.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 62, by G. M. Kibler, T. F. Lyon, and V. J. DeSantis. 31 Mar 62, 32p. incl. illus. tables, 8 refs.
(Contract AF 33(616)6841)
Unclassified report

DESCRIPTORS: (*Refractory materials, Plastics, Carbonization, Vaporization, Phase studies, Molecular spectroscopy, Infrared spectroscopy, Ultraviolet spectroscopy, Resonance absorption, Vapor pressure, High temperature research, *Blackbody radiation.) (*Nitrides, Zirconium compounds, Tantalum compounds, Hafnium compounds.) (*Thorium compounds, Oxides.) (*Borides, Niobium compounds, Titanium compounds, Zirconium compounds.) (Physical properties, Chemical properties, Spectrographic analysis.)

Equilibrium N pressures over the ZrN single phase were measured by determining the rate of N effusion from a Knudsen cell. The measurements span a range from 1424 to 2360 K, a range of composition from 13.0 down to 9.79% N by weight and a range of N pressures from 2 x 10 to the -8th power to 3 x 10 to the -5th power atm. These data are presented graphically. Both IR and visible spectra were obtained from matrix isolated species effusion from a Knudsen orifice in a cell containing ThO2. The observed bands are tabulated; the analysis of the spectra are not complete. Results of efforts to measure the resonance line absorption by B atoms over pure B indicated serious interaction of the B with all container materials thus far investigated. The 6 compounds, NbB2, TiB2, ZrB2, TaN, ZrN and HfN, for which emissivities are being measured, have been characterized by chemical analysis, density measurement, crystallographic structure, electron micrographic examination and x-ray diffraction measurements. (Author)

AD-274 742 Div. 14, 17, 12
(TISTM/BRW) OTS price $2.25

Little, Arthur D., Inc., Cambridge, Mass.
INVESTIGATION OF MATERIALS FOR VACUUM INSULATION UP TO 4000 F.
Rept. for 15 Jan 60-14 July 61 on Materials Application,
by Peter E. Glaser, Alfred E. Wechsler and others. Jan 62, 80p. incl. illus. tables, 26 refs.
(Contract AF 33(616)6816, Proj. 7381)
(ASD TDR 62-88) Unclassified report

DESCRIPTORS: (Low pressure research, High temperature research, *Thermal insulation, *Vacuum systems, Materials, Graphite, Fibers, Powders (ADL-17), Thorium compounds, Dioxides, Metal plates, Tantalum for Shielding of Thermal radiation.) (Heat transfer, Thermal conductivity, Physical properties, Chemical properties, Tests.) (Power reactors, Nuclear power plants, Rocket motors, Hypervelocity vehicles, Spaceships, Satellite vehicles.)

An investigation was made of materials for vacuum insulation up to 4000 F. ADL-17, graphite fibers, thoria powder, and Ta radiation shields were chosen as insulation components for long-term high-temperature tests on the basis of theoretical studies of both the mechanisms of heat transfer through evacuated insulation materials and preliminary experimental work. Thermal protection systems consisting of these materials were chemically and physically stable enough to be effective insulators for over 100 hr at 3000 and for several hours at 3500 F. Although only readily available materials were used, their insulating performance points to the potential effectiveness of improved materials. (Author)

AD-274 804 Div. 14, 17, 27, 12
(TISTM/BRW) OTS price $2.00

Defense Metals Information Center, Columbus, Ohio.
SUMMARY OF THE FIFTH MEETING OF THE REFRACTORY COMPOSITES WORKING GROUP,
by W. D. Klopp. 12 Mar 62, 74p. incl. illus. tables, 13 refs. (DMIC rept. no. 167)
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: (Conferences, Thermal insulation, *Refractory materials, *Composite materials.) (*Ceramic materials, Refractory coatings, Ceramic coatings, Metal coatings, Coatings, Cermets, Graphite, *Metals, Molybdenum, Niobium, Tantalum, Tungsten, Vanadium, Vanadium alloys, Molybdenum alloys, Niobium alloys, Tantalum alloys, Tungsten alloys.) (Reinforcing materials, Fibers, Single crystals, Ceramic fibers.) (Guided missile noses, Rocket motor nozzles, Rocket noses, Re-entry vehicles.) Alloys, Flame spraying, Plasma jets, Ablation, Dispersion hardening.

Information is summarized on refractory composites for use above 2500 F presented at the Fifth Refractory Composites Working Group Meeting held in Dallas on August 8 to 10, 1961. The subject of refractory composites is extensive; reports presented at this meeting dealt with protective coatings, heat-resistant ceramic composites, dispersion strengthening, plasma spraying, and high-temperature reactions. Protective metallic and intermetallic coatings are currently under development for V and the four refractory metals. Most attractive are the silicide coatings, which are protective to temperatures in the vicinity of 3000 F. Developments on silicide coatings include a fluidized-bed technique for application of the coating and recognition of substrate alloying effects on coating protectiveness. Aluminide coatings are simpler to apply. The application of silicide and aluminide coatings to actual space-vehicle components has shown that coating uniformity, edge protection, and repairability are serious problems. (Author)

15. MATHEMATICS

AD-274 595 Div. 15
(TISTP/GRW) OTS price $2.60

Rand Corp., Santa Monica, Calif.
LINEAR PROGRAMMING IN A MARKOV CHAIN. NOTES ON LINEAR PROGRAMMING AND EXTENSIONS. PART 59,
by G. B. Dantzig and Philip Wolfe. Apr 62, 24p. incl. table, 6 refs. (Memo. no. RM-2957-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Linear programming, *Statistical processes, Supplies, Costs, Scheduling.)

An infinite Markov process with a finite number of states is considered in which the transition probabilities for each stage range independently over sets that either are finite or are convex polyhedra. A finite computational procedure is given for choosing those transition probabilities which minimize appropriate functions of the resulting equilibrium probabilities. (Author)

AD-274 596 Div. 15
(TISTP/GRW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
A LINEAR PROGRAM OF PRAGER'S. NOTES ON LINEAR PROGRAMMING AND EXTENSIONS. PART 60,
by Oliver Gross. Apr 62, 22p. (Memo. no. RM-2993-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Linear programming, *Scheduling, Integrals.)

For the problem of minimizing the integral $f(x)dx$ from limits of 0 to 1 subject to the constraints

$$-f(x) \leq xg(y) \leq f(x) \quad \text{if } 0 \leq x \leq y \leq 1,$$

$$-f(x) \leq xg(y) - x + y \leq f(x) \quad \text{if } 0 \leq y \leq x \leq 1,$$

solutions are given to prove both that they satisfy the constraints and that they have the extremizing property. The problem arose in an elastico-plastic, structural-design context. (Author)

AD-274 598 Div. 15, 2
(TISTP/MFA) OTS price $1.60

RAND Corp., Santa Monica, Calif.
ON A MECHANICAL INTERPRETATION OF THE NULL GEODESICS IN STATIC EINSTEIN-RIEMANN SPACES,
by T. Y. Thomas and D. G. B. Edelen. Mar 62, 15p. 2 refs. (Memo. no. RM-3031-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Algebraic topology, *Relativity theory, *Geodesics, Particle trajectories, Light transmission.) (*Statistical tests, Partial differential equations, Transformations (Mathematics).)

Normal trajectories are applied to any moving, two-dimensional surface which carries a mechanical disturbance through a material body which are projections into that body of light rays in an Einstein-Riemann space whose local velocity of light is equal to the normal velocity of the surface through the material body at corresponding points. (Author)

AD-274 766 Div. 15
(TISTP/TL) OTS price $4.60

Mathematics Research Center, U. of Wisconsin, Madison
THEORY OF m-VALUED DELTA-RING,
by Makoto Itoh. Feb 62, 46p. incl. illus. 8 refs. (MRC Technical summary rept. no. 290)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: (Theory of representation for Boolean *Algebras.) (Functions, Polynomials, Operators (Mathematics), Partial differential equations, Functional analysis.)

AD-274 779 Div. 15, 2
(TISTP/JW) OTS price $4.60

Rensselaer Polytechnic Inst., Troy, N. Y.
THE NONLINEAR INTERACTION OF TWO DISTURBANCES IN THE THERMAL CONVECTION PROBLEM,
by Lee A. Segel. 20 Feb 62, 40p. incl. illus. 10 refs. (RPI MathRep no. 51)
(Contract Nonr-59108)
Unclassified report

DESCRIPTORS: (*Convection, Perturbation theory, Non-linear differential equations, Periodic variations.) (*Thermal conductivity, Stability, Mathematical analysis, Temperature, Viscosity.)

In the thermal convection problem with free boundaries, the interaction of two roll disturbances is considered. The problem is reduced to a pair of nonlinear ordinary differential equations, which should also provide a model for the interaction of two disturbances in more general situations than that for which these equations have been derived. The equations contain several parameters which necessitates a discussion of several possible types of solution. Under certain circumstances, an equilibrium state may be composed of a mixture of a linearly stable disturbance and a linearly unstable disturbance. For the thermal convection problem, when the Rayleigh number is slightly above the minimum critical value, the equilibrium state will contain only one of two linearly unstable disturbances. Results are compared with experimental observations. (Author)

AD-274 808 Div. 15, 9
(TISTP/TL) OTS price $4.60

Weizmann Inst. (Israel).
NUMERICAL INTEGRATION OF THE NAVIER-STOKES EQUATIONS,
by J. Gillis. 20 Jan 62, 39p. incl. tables, 10 refs. (Technical rept. no. 2)
(Contract AF 61(052)352)
(AFOSR-2236) Unclassified report

DESCRIPTORS: (*Partial differential equations, *Numerical methods and procedures, Integration, Differential equations, Series.) (Pipes, *Fluid flow, Relaxation time, Viscosity, Reynolds number, Configuration.)

The relaxation solution and results obtained for the flow of a viscous fluid in the inlet region of a straight circular pipe at high Reynolds number are described. Analytical and computational work on the Hamel pattern of flow between non-parallel plane walls is also described. (Author)

Division 16 - MEDICAL SCIENCES
Division 17 - METALLURGY

AD-274 836 Div. 15
(TISTP/TL) OTS price $2.60

RAND Corp., Santa Monica, Calif.
MULTIPLICITIES AND MINIMAL WIDTHS FOR (0,1)-MATRICES,
by D. R. Fulkerson and H. J. Ryser. Mar 62, 21p. 9 refs. (Memo. no. RM-2897-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Matrix algebra, Sequences, Vector analysis, Transformations (Mathematics).)

The present analysis continues the study of alpha-width of a (0,1)-matrix. The principal new result is a simple construction that produces a matrix having the property that its alpha-widths are minimal for all alphas. (Author)

AD-274 838 Div. 15, 2
(TISTP/GRW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
AUGMENTATION ANALYSIS OF THE EINSTEIN GRAVITATIONAL FIELD,
by Dominic G. B. Edelen. Apr 62, 25p. 3 refs.
(Memo. no. RM-3092-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Gravity, *Relativity theory, Algebraic topology, Tensor analysis, Calculus of variations.)

The groundwork for investigating the possibility of the control of gravitational fields in the neighborhood of a massive body is considered. The Einstein equations for the gravitational field are examined under the assumption that one knows an exact solution of those equations for a given momentum-energy tensor. The desired solution corresponding to the augmented momentum-energy tensor is assumed to be an augmentation of the metric Gravitational Field. This leads to an exact representation of the field equations of general relativity in a form for which each term is a tensor. The problem of superimposing a weak gravitational field on a known field is investigated, and solutions are obtained by means of an invariant Green's integral tensor. (Author)

16. MEDICAL SCIENCES

No Entries

17. METALLURGY

AD-274 484 Div. 17, 25
(TISTP/JW) OTS price $5.60

Lessells and Associates, Inc., Boston, Mass.
ACOUSTIC EMISSION UNDER APPLIED STRESS.
Rept. for 31 Mar 58-31 Aug 61 on Solid State Research and the Properties of Matter,
by B. H. Schofield. Dec 61, 45p. incl. illus. 28 refs.
(Contract AF 33(616)5640)
(ARL-150) Unclassified report

DESCRIPTORS: (*Acoustics, *Deformation, *Single crystals (Metallurgy), Aluminum, Measurement, Wave transmission, Stresses.)

Studies of the acoustic emission phenomenon of metals are discussed. The general nature of the emission of materials is presented, but primary emphasis is placed on the behavior of the phenomenon in various crystallographic orientations of both zinc and aluminum single crystals; the intent of the investigations being the determination of the source of the emitted sounds. The results are examined and interpreted in the light of fundamental deformation mechanisms, i.e., dislocations, and the particular manner in which they may induce such emission. All experiments were conducted under tensile loading of the specimens. Descriptions of the equipment, testing and analysis techniques, and findings with interpretation are presented in detail. (Author)

AD-274 496 Div. 17, 25, 7
(TISTM/GEC) OTS price $4.60

Naval Ordnance Lab., White Oak, Md.
TEMPERATURE-PRESSURE PROJECTION OF THE THREE-PHASE LINE OF LEAD TELLURIDE,
by Richard F. Bis. 1 July 61, 38p. incl. illus. tables, 18 refs. (Rept. no. NOLTR 61-128)
Unclassified report

DESCRIPTORS: (*Semiconductors, *Intermetallic compounds, Crystals, *Single crystals, Alloys, *Lead alloys, *Tellurium alloys, Tellurides.) (*Phase studies, Temperature, Vapor pressure, Thermodynamics, Theory.)

The temperature pressure projection of the three-phase line was measured for PbTe using a double furnace arrangement. It was possible to obtain data only on the Te-rich limit of stability, as the partial pressure of PbTe is nearly equal to the partial pressure of diatomic Te at 910 C, and is always comparable to or greater than the partial pressure of Pb in equilibrium with the crystal of PbTe. R. F. Brebrick's theory, (J. Phys. Chem. Solids 18, 116, (1961)), for the limits of stability of a binary semiconductor MN was fitted between 400 and 600 C to the experimental data obtained, and to the results obtained elsewhere for the temperature-composition projection of the three-phase line. The theory contains three parameters: the Schottky constant, the intrinsic partial pressure, and the intrinsic carrier concentration, none of which were known. Assuming an intrinsic carrier concentration the other two parameters were calculated between 400 and 600 C and extrapolated to higher temperature. This was done for two estimates of the intrinsic carrier concentration. In both cases the Schottky constant and the intrinsic partial pressure and exponential functions of reciprocal temperature. The Te-rich limit of stability above 600 C was calculated using the parameters and the experimental data obtained. (Author)

AD-274 558 Div. 17, 14, 25
(TISTM/BRW) OTS price $17.00

Northrop Corp., Hawthorne, Calif.
THE DETERMINATION OF SPECTRAL EMISSIVITIES, REFLECTIVITIES, AND ABSORPTIVITIES OF MATERIALS AND COATINGS.
by J. G. Adams. 3 Aug 61, rev. 13 Feb 62, 259p. incl. illus. table, 16 refs. (Rept. no. NOR-61-189, rev. A)
Unclassified report

DESCRIPTORS: (*Alloys, *Metals, *Ceramic coatings, *Ceramic materials, Thermal radiation, Reflection, Absorption, Blackbody radiation, Spectrographic analysis, Spectrophotometers, Spectrographic data, Ultraviolet radiation, Light, Infrared radiation, *Photoemission.) (Chromium alloys, Nickel alloys, Steel, Cobalt alloys.) (Beryllium, Niobium, Tantalum, Titanium, Tungsten, Vanadium, *Metal coatings.) (Boron compounds, Carbides, Tantalum compounds, Zirconium compounds, Oxides, Molybdenum compounds, Silicides.) (Tungsten alloys, Stainless steel, Titanium alloys, Molybdenum alloys, Iron alloys.)

Spectral data are presented on surface emissivities, reflectivities and absorptivities of materials and coatings at various temperatures and environmental conditions. Test specimens were disks 15/16 in. in diameter, cut from sheets as received from the vendor. The materials included Astrolloy, Be, Hastalloy X, Haynes Stellite 25, Inconel 702, Inconel X, Mo-0.5 Ti alloy, Nb, Potomac A, Rene' 41, Ta, Ti, W, Udimet 500, V, Vascojet 1000, PH 15-7 Mo steel, 17-7 PH steel, AM 350 steel, and Armco blackened steel. Flame sprayed coatings on Inconel X consisted of B_4C, 20/80 Cr/Ni, TaC, W, 50/50 W/Co, MoS_2, and ZrO_2. Shiny and matte finish coatings of ceramic Au on Ti were included.

AD-274 559 Div. 17, 1
(TISTM/BRW) OTS price $3.60

Northrop Corp., Hawthorne, Calif.
MECHANICAL PROPERTIES OF 6Al-4V TITANIUM ALLOY FORGINGS,
by J. M. Hoffhine and C. M. Miller. 15 Mar 62, 27p. incl. illus. tables (Rept. no. NOR-62-60)
Unclassified report

DESCRIPTORS: (Jet training planes, Jet engines, Mounting brackets, Forging, *Titanium alloys (6Al-4V), Aluminum alloys, Vanadium alloys, Quality control, Mechanical properties, Tensile properties, Deformation, Stresses, Statistical analysis.)

Mechanical properties were determined for production engine mount support forgings made from 6Al-4V titanium alloy. The data derived from the production surveillance were treated statistically. (Author)

AD-274 565 Div. 17
(TISTM/BRW) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF CONSTITUENT PARTICLES ON THE NOTCH-SENSITIVITY AND FATIGUE-CRACK-PROPAGATION CHARACTERISTICS OF ALUMINUM-ZINC-MAGNESIUM ALLOYS,
by Larry H. Glassman and Arthur J. McEvily, Jr. Apr 62, 27p. incl. illus. tables, 7 refs. (Technical note D-928)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-928.

DESCRIPTORS: (Sheets, *Aluminum alloys (7075-T6 and X7275-T6), Zinc alloys, Magnesium alloys, Sensitivity, Fracture (Mechanics), Propagation, *Fatigue (Mechanics), Particles, Mechanical properties, Deformation, Plasticity, Stresses.) Alloys.

Sheet specimens of two Al-Zn-Mg alloys, 7075-T6 and X7275-T6, were tested to determine the relative sensitivity to sharp notches under static loading conditions and to determine relative resistance to fatigue crack propagation. These alloys differ chiefly with respect to the number and size of constituent particles, the level being considerably lower in the X7275 alloy. Reduction in particle size and number appeared to increase somewhat the ductility of unnotched specimens without impairing the static strength, but the material with the greater constituent-particle content was more resistant to fatigue crack propagation. For both materials the sensitivity to sharp notches under static loading conditions was about the same. A discussion and interpretation of the results are given. A sufficiently large number of weakened constituent particles may have a beneficial effect on fatigue crack propagation in that they can act as crack arrestors and retard the propagation of fatigue cracks. (Author)

AD-274 567 Div. 17, 27
(TISTM/BRW) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
HIGH-TEMPERATURE TENSILE AND STRESS-RUPTURE PROPERTIES OF SOME ALLOYS IN THE TUNGSTEN-MOLYBDENUM SYSTEM,
by Paul F. Sikora. Apr 62, 19p. incl. illus. tables, 8 refs. (Technical note D-1087)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1087.

DESCRIPTORS: (High temperature research (2500 to 4400 F), Tungsten, *Tungsten alloys, *Molybdenum alloys (10, 25, 50 wt-%), Tensile properties, Stresses, Rupture.) Rocket motors, Materials.

Three alloys consisting of 10, 25, and 50 wt-% Mo in W were evaluated at 2500 to 4400 F to determine their tensile properties. Results showed the 10 and 25 wt-% alloys have higher tensile strength than unalloyed W at 2500 and 3000 F and equivalent strength to about 3500 F. The 50 wt-% alloy has strength equivalent to unalloyed W from 2500 to 3200 F. Unalloyed W has higher strength than the alloys above 3500 F. The results of stress-rupture tests for the 50 wt-% alloy are presented for the temperature range oof 2500 to 3500 F in the as-worked and fully annealed conditions. (Author)

AD-274 611 Div. 17, 26
(TISTM/BRW) OTS price $8.60

Sylvania Electric Products, Inc., Towanda, Pa.
DEVELOPMENT AND PRODUCTION OF IMPROVED MOLYBDENUM SHEET BY POWDER-METALLURGY TECHNIQUES.
Interim rept. no. 13, 1 Dec 61-31 Jan 62, by R. B. Bargainnier, S. Friedman and others. 30 Mar 62, 79p. incl. illus. tables, 17 refs. (Contract NOa(s) 60-6018-c).
Unclassified report

Division 17 - METALLURGY

DESCRIPTORS: (Production, *Molybdenum alloys, Titanium alloys, Sheets, *Powder metallurgy, Controlled atmospheres, Vacuum furnaces, *Sintering.) (Additives, Carbon, Hydrogen, Nitrogen, Oxygen, Heat treatment, Hardening, Dispersion hardening, Titanium compounds, Carbides, Nitrides, Oxides.) (Alloys, Heat resistant alloys, Powder alloys, Powder metals, Hardness, Microstructure, Tensile properties, Processing.)

This report includes:
A STUDY OF THE BASIC FACTORS INVOLVED IN STRENGTHENING POWDER-METALLURGY Mo-Ti-C AND Mo-Ti-N ALLOY SHEET, by S. Friedman, W. Pollack, and C. D. Dickinson. 30 Mar 62.

Strengthening in powder-metallurgy Mo-Ti-C probably involves the solution of Ti and C during sintering followed by the formation of precipitates of TiC during fabrication. Control of fabrication temperatures or the use of an in-process solution treatment or both may be necessary to obtain optimum properties. O and N contamination during sintering is detrimental since it decreases the amount of Ti that goes into solution by forming massive, stable titanium oxides and nitrides. The formation of massive Mo_2C particles at sintering temperatures above 2000 C prevents a straightforward correlation of C content and strength. Strengthening in powder-metallurgy Mo-Ti-N probably involves the formation of a fine dispersion of TiN by internal nitridization. N additions to Mo-Ti significantly raise the recrystallization temperature. However, its effect on high-temperature strength is less than that of C. O appears to have a detrimental effect on the recrystallization temperature of Mo-Ti-N. (Author)

AD-274 616 Div. 17, 26
(TISTM/BRW) OTS price $4.60

Solar Aircraft Co., San Diego, Calif.
DEVELOPMENT OF LOW TEMPERATURE BRAZING OF TUNGSTEN FOR HIGH TEMPERATURE SERVICE.
Final rept.,
by C. W. Haynes. 26 Mar 62, 35p. incl. illus. tables, 4 refs. (Rept. no. RDR 1249-6)
(Contract NOw 61-0414-c)
Unclassified report

DESCRIPTORS: (Refractory materials, *Tungsten, *Brazing, Silver solders.) (Soldering alloys, Platinum alloys, Boron alloys, Powder alloys, Additives, Powder metals, Foils, Titanium, Zirconium, Halides, Metal joints, Welded joints, Diffusion, Thickness.) (Chemical reactions, Tungsten compounds, Borides.)

The Pt-B reactive braze system for the low-temperature brazing of W for high-temperature service was investigated. Alloys ranging in composition from Pt-1.0B to Pt-4.5B were prepared and used for brazing lap shear specimens of tungsten sheet material. Specimens were tested by heating until separation occurred while loaded to a shear stress on the joint of 20 to 800 psi. The effects of B content of the alloy, amount of W powder addition to the joint, and diffusion treatments after brazing were determined. Optimum joint thickness was defined and limits for satisfactory joints established. The factor limiting the maximum temperature capability of the system was determined to be the tungsten boride formed in the reactive process. Various modifications of the basic Pt-B alloy were investigated; certain halide additions to the joint showed the most promise for raising the maximum temperature capability. (Author)

AD-274 633 Div. 17, 30
(TISTM/BRW) OTS price $.50

Watertown Arsenal Labs., Mass.
RADIOGRAPHY OF URANIUM,
by Satrak Der Boghosian and Charles E. Dixon.
Mar 62, 15p. incl. illus. 3 refs. (Rept. no. WAL TR 142.1/2)
Unclassified report

DESCRIPTORS: (*Uranium, Uranium alloys (92 wt.-%), Structures, Quality control, *Radiography, *Industrial radiography, Non-destructive testing, X-ray photography.) X rays, Absorption, Scattering, Shielding, Test methods.)

In the radiography of thick uranium sections, special projection and filtering techniques were developed to reduce internal scattering. The techniques developed have produced acceptable quality radiographs of uranium sections up to 2-3/4 inches in thickness using 2-mev industrial radiographic equipment. (Author)

AD-274 640 Div. 17, 25
(TISTM/BRW) OTS price $2.60

Hammond Metallurgical Lab., Yale U., New Haven, Conn.
DIFFRACTION FROM LAYER FAULTS IN BCC AND FCC STRUCTURES,
by C. N. J. Wagner, A. S. Tatelman, and H. M. Otte. Mar 62, 28p. incl. illus. tables, 24 refs. (Technical rept. no. 1)
(Contract Nonr-60943; In cooperation with RIAS, Inc., Baltimore, Md., Contract Nonr-370600)
Unclassified report

DESCRIPTORS: (Alloys, Metals, *Crystal structure, Lattices, Deformation, X-ray diffraction analysis, *Tantalum, *Niobium, *Martensite, Stainless steel (16 Cr-12 Ni).)

Calculations, using the Warren-Mering method, of the broadening and shift of the X-ray diffraction peaks in powder patterns were performed for the situation in which an interplanar spacing change occurs at the fault plane. Deformation-spacing faults on the (211) layers of the bcc lattice and the (111) layers of the fcc lattice, and spacing faults are discussed in detail. The principal effect of the spacing change is to introduce additional broadening and peak shifts, the magnitude (and direction, in the the case of the peak shifts) of which depends on the reflection. In bcc structures the effect is particularly striking because no peak shifts are expected in the presence of stacking faults whose interplanar spacing is unchanged. Measurements were made on 3 cold worked bcc materials: Ta, Nb and a stainless steel martensite. No measurable peak shifts were found in Ta. In Nb and in the martensite, however, small shifts were observed and were in directions predicted from the theory; the shifts could therefore be interpreted and indicated an expansion of the layer spacing at the fault. (Author)

AD-274 649 Div. 17, 32
(TISTB/LH) OTS price $5.60

Defense Metals Information Center, Columbus, Ohio.
DEFENSE METALS INFORMATION CENTER SELECTED

ACCESSIONS,
comp. by Virginia L. Frazier. Mar 62, 44p.
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: (*Bibliography, *Metals, *Heat resistant alloys, *Ceramic materials, *Refractory materials, Alloys.) (Steel, Stainless steel, Iron alloys, Nickel alloys, Beryllium, Titanium, Magnesium, Niobium, Chromium, Molybdenum, Tantalum, Vanadium, Tungsten.)

AD-274 716 Div. 17
(TISTM/BRW) OTS price $1.60

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
RADIATION INDUCED OVERAGING OF A 2024-T3 ALUMINUM ALLOY.
Rept. on Mechanism of Ductility and Fracture,
by Attwell M. Adair, Rollin E. Hook, and Harold J Garrett. Sep 61, 12p. incl. illus. table, 16 refs. (Rept. no. ARL-132; Supplement to WADC TR 58-605, AD-215 540)
(Proj. 7024)
Unclassified report

DESCRIPTORS: *Aluminum alloys (2024-T3), Copper alloys, Magnesium alloys, Manganese alloys, Neutron bombardment, Heat treatment, Aging, Radiation effects, Mechanical properties, Hardness, Metallurgical analysis, X-ray diffraction analysis, Microstructure.

Annealing experiments on both irradiated and unirradiated samples of a 2024-T3 Al alloy were followed by metallographic examination, hardness measurements and analysis of X-ray back reflection patterns. The severely overaged condition of this alloy after neutron irradiation previously reported by Wallack (AD-215 540) is shown to be primarily radiation induced and not due only to a high ambient temperature. This overaging is attributed to an excess vacancy concentration during irradiation equivalent to at least an additional 150 C in sample temperature. (Author)

AD-274 767 Div. 17, 26
(TISTM/BRW) OTS price $3.60

Wah Chang Corp., Albany, Oreg.
TUNGSTEN EXTRUSION DEVELOPMENT PROGRAM.
Interim technical engineering rept., 20 Dec 61-20 Mar 62,
by A. E. Riesen. 20 Mar 62, 28p. incl. illus. tables, 2 refs.
(Contract AF 33(600)42395, Proj. 7-793)
(ASD Interim rept. no. 7-792, vol. 3)
Unclassified report

DESCRIPTORS: (*Tungsten, *Tungsten alloys (W-3Mo), Molybdenum alloys, *Extrusion, Production, Processing, Surface properties.) (Microstructure, Dies, Materials, Lubricants, Glass, Glass textiles.) (Castings, Chemical analysis, Non-destructive testing, Ultrasonics, Heating, Heat treatment, Temperature.)

Five extrusions of as-cast W-3Mo alloy were accomplished within the temperature range of 3200 to 4000 F at reduction ratios of 11:1 to 17:1. Liner pressures indicated for these extrusions were within the available capacity of 210,000 psi. Surface quality was typical of those extrusions made from an as-cast billet condition. This surface quality was also related to die performance and possible interaction with lubricants. (Author)

AD-274 785 Div. 17, 27
(TISTM/BRW) OTS price $1.60

Aerojet-General Corp., Azusa, Calif.
INVESTIGATION OF STRESS-CORROSION CRACKING OF HIGH-STRENGTH ALLOYS.
Quarterly progress rept. no. 6, 1 Jan-31 Mar 62,
by R. J. Uzdarwin. 20 Apr 62, 4p. illus. tables.
(Rept. no. 0414-01-6)
(Contract DA 04-495-ORD-3069)
Unclassified report

DESCRIPTORS: (Alloys, *Heat resistant alloys, *Steel, *Stainless steel, *Titanium alloys (120 VCA), Vanadium alloys, Chromium alloys, Aluminum alloys, *Stresses, *Corrosion, Fracture (Mechanics), Failure (Mechanics).) Rocket cases, Materials, Corrosion inhibition, Plastic coatings, *Corrosion research, Corrosive gases, Corrosive liquids.

Extended stress-corrosion testing of selected unwelded bent-beam specimens of 6 high-strength alloys has continued for 33 weeks, and of U-bend specimens for 40 weeks. The alloys of AM355 and PH 15-7 Mo stainless steel and B120VCA titanium were not found to be susceptible to stress-corrosion cracking in any of the environments tested, while the alloy steels of Ladish D6AC, 300M, and Vascojet 1000 had specific susceptibility in some of the environments tested. The fabrication of welded bend-beam specimens of selected materials is nearing completion, and environmental testing is expected to begin shortly. The evaluation of several coatings for preventing stress-corrosion cracking was initiated, and, on the basis of the brief data accumulated to date, indications are that the coatings are beneficial, at least in extending the time-to-failure from stress-corrosion cracking. (Author)

AD-274 805 Div. 17
(TISTM/BRW) OTS price $2.75

Defense Metals Information Center, Columbus, Ohio.
SEMIAUSTENITIC PRECIPITATION-HARDENABLE STAINLESS STEELS,
by D. C. Ludwigson. 6 Dec 61, 1v. incl. illus. tables (DMIC rept. no. 164)
(Contract AF 33(616)7747, Proj. 2(8-8975)
Unclassified report

DESCRIPTORS: (*Stainless steel, *Heat resistant alloys, *Corrosion resistant alloys, Austenite, Martensite, Dispersion hardening, Heat treatment, Mechanical properties, Physical properties, Data.) (Deformation, Phase transitions, Cooling, Aging.)

The semiaustenitic precipitation-hardenable stainless steels remain austenitic on cooling from a solution heat treatment at about 1950 F. In this form they are readily fabricable. Subsequent treatment at about 1400 or at about 1725 F depletes the austenite of Cr and C to the extent that martensite forms on cooling to room temperature or -100 F, respectively. Final hardening is effected by tempering, or aging, at 750 to 1100 F. The semiaustenitic precipitation-hardenable stainless steels may be obtained as transformed at the mill by cold rolling. In this condition they lack the good formability of solution-heat-treated material. However, the fabricator need only temper them to obtain very high strengths. These steels have a combination of good formability, high strength, and excellent corrosion resistance that is not easily matched by other materials. (Author)

Division 18 - MILITARY SCIENCES AND OPERATIONS
Division 19 - NAVIGATION

18. MILITARY SCIENCES AND OPERATIONS

AD-274 610 Div. 18, 12
(TISTW/RD) OTS price $8.10

Stanford Research Inst., Menlo Park, Calif.
RESEARCH ON BALLISTIC MISSILE DEFENSE PHENOMENOLOGY: PART ONE.
Semi-Annual technical summary rept. 1 Oct 61-28 Feb 62,
ed. by Carson Flammer. Mar 62, 78p. incl. illus. 60 refs.
(Contract SD-103)
Unclassified report

DESCRIPTORS: (*Electromagnetic waves, *Scattering, Plasma physics, Gas ionization.) (Surface to surface, Guided missiles, Interception, Interception probabilities, Re-entry vehicles.) (Electron beams, Re-entry aerodynamics, Ionization, Shock tubes, Electric discharges.) Magnetohydrodynamics, Antiaircraft defense systems.

Work is summarized on a study of ballistic missile phenomenology of interest in the design of ballistic missile defense systems. Part one discusses electromagnetic scattering from plasma, atomic, and chemionization processes, simulation techniques, and theoretical missile phenomenology. Part two (AD-328 823) includes evaluation of terminal phase discrimination techniques, and a discussion of planning for the Woomera installation. (Author)

AD-274 739 Div. 18
(TISTE/CDM) OTS price $6.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
A MODEL FOR THE STUDY OF COMMUNICATIONS DEGRADATION,
by Kenneth M. Sayre. 29 Mar 62, 64p. incl. illus. table (Rept. no. 22G-7)
(Contract AF 19(604)7400)
(AFESD TDR 62-78) Unclassified report

DESCRIPTORS: (*Combat, *Warfare, *Games theory, Equations, Digital computers.) (Communication systems, Military communications, Military intelligence, Deterioration, Simulation, Military operations.)

A model is presented whereby the mutual attrition of 2 forces in combat can be studied under interdependent conditions. Interaction of the 2 forces is simulated by a set of equations which make the attrition rate of one a function of the numbers, firepower, and disposition of the other. Moment by moment progress of the battle under a given set of conditions is determined on a digital computer. The model is intended primarily to aid in the evaluation of the relative importance of combat capabilities not all of which can be maximized simultaneously. Construction of the model is in 3 stages. In the basic model the attrition equations are explained and illustrated. Each force is composed of units of 3 types, the numbers and characteristics of which can be specified according to the demands of a particular problem. In the dynamic model provisions are introduced for moving units of either force from position to position to seek out the most advantageous deployment of those units in regard to their differing mobility and combat capabilities in different types of terrain. In the controlled degradation model means are provided for varying systematically the accuracy and completeness of both intelligence and command communications. (Author)

19. NAVIGATION

AD-274 458 Div. 19
(TISTW/RD) OTS price $3.60

Aeronautical Instruments Lab., Naval Air Development Center, Johnsville, Pa.
TEST METHODS FOR THE SINGLE DEGREE OF FREEDOM INTEGRATING RATE GYRO. PHASE II. ACCELERATION SENSITIVE DRIFT CHARACTERISTICS,
by R. S. Vaughn. 18 Dec 61, 31p. incl. illus. table (Rept. no. NADC-AI-6191)
Unclassified report

DESCRIPTORS: (*Gyroscopes, Drift, Acceleration, Test methods, Airborne.) Inertial navigation, Inertial guidance.

Methods of evaluating a gyro and its drift tendencies which are sensitive to the acceleration environment were studied. Procedures used by various industrial and institutional facilities were reviewed. Some revisions, extensions, and new techniques have been developed, resulting in the procedures described. These techniques, now in use, evaluate the particular mass unbalance and elastic components which produce drift in an acceleration environment. These parameters, while of interest in aircraft applications of inertial systems, are even more important in missile applications where the acceleration level is higher. These parameters can be used to predict the gyro drift under a specific acceleration environment profile and can be used by the gyro designer to improve the drift characteristics in such environments. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-274 455 Div. 20, 30, 7
(TISTP/JW) OTS price $8.10

American Machine and Foundry Co., Greenwich, Conn.
AVAILABILITY ANALYSIS FOR NUCLEAR POWER PLANTS, VOLUMES I AND II.
Technical rept. for 7 June-31 Dec 61, by G. Hefferon. Dec 61, 177p. incl. illus. tables, 14 refs.
(Contract AF 29(601)4561, Proj. 6185)
(AFSWC TDR 61-100, vol. 1 and 2)
Unclassified report

DESCRIPTORS: (Mathematical prediction, Probability, Reliability, *Nuclear power plants, Generators.) (*Digital computers, Computer logic, Programming.)

A method of determining the probability of successful operation of a nuclear power generating station for any minimum acceptable fraction of a given operating cycle is described. A digital computer program is provided to carry out the required calculation and automatically indicate the return to be expected from improved reliability and redundancy in the weakest component. Sample calculations for EBWR and PM-1 are presented to illustrate the use of the method. It is shown that to increase the accuracy of these probability calculations better reliability data are required, in particular on components specifically designed for inclusion in nuclear power plants. To overcome this difficulty, a proposed reliability data gathering procedure is presented. The procedure is based upon the use of punched cards to facilitate data handling. An additional computer program is provided to accept component failure, repair data, and plant operating history, and to produce failure rate and average repair time information. (Author)

AD-274 519 Div. 20, 6
(TISTP/WH) OTS price $4.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
IMPROVEMENT OF A BROAD-LINE NUCLEAR MAGNETIC RESONANCE SPECTROMETER,
by Gerhard Englert and Richard Volpicelli. Feb 62, 25p. illus. 20 refs.
(Contract Nonr-186613)
Unclassified report

DESCRIPTORS: (*Nuclear magnetic resonance, *Radiofrequency spectrum analyzers, Design.) (Oscillators, Coils, Electronic circuits, Narrowband, Amplifiers and Lock-in Detectors, Modulators, Power supplies, Storage batteries, Direct current.) Signal-to-noise ratio.

The experimental work is concerned with the rebuilding of a broad-line nuclear magnetic resonance spectrometer. First, a short description of the deficiencies and disadvantages of the previous spectrometer is given. Second, a number of changes are described and discussed in the set-up and the electronic circuits by which considerable improvements in the dependability and sensitivity of the instrument was achieved. Third, a commercial 60 Mc. Varian high-resolution spectrometer to broad-line application by the adaption of some units of the broad-line instrument is treated. This was undertaken to compare the sensitivity and signal-to-noise ratio of the two different types of n.m.r. spectrometers. (Author)

AD-274 529 Div. 20, 25
(TISTP/JW) OTS price $8.10

Massachusetts Inst. of Tech., Div. of Sponsored Research, Cambridge.
THE MECHANISM OF HEAT TRANSFER IN NUCLEATE POOL BOILING,
by Chi-Yeh Han and Peter Griffith. Feb 62, 76p. incl. illus. tables, 18 refs. (Technical rept. no. 19; DSR no. 7-7673)
(Contract Nonr-184139)
Unclassified report

DESCRIPTORS: (*Bubbles, Gases, Surfaces, Liquids, Heat transfer, *Nucleate boiling.)

A criterion is developed for bubble initiation from a gas filled cavity on a surface in contact with a superheated layer of liquid. It is found that the temperature of bubble initiation on a given surface is a function of the temperature conditions in the liquid surrounding the cavity as well as the surface properties themselves and the delay time between bubbles is a function of the bulk liquid temperature and the wall superheat and is not constant for a given surface. With a thermal layer thickness and a critical wall superheat relation for the cavity, a bubble growth rate is obtained. Bubble departure is considered. The Jakob and Fritz relation works as long as the true (non-equilibrium) bubble contact angle is used. The effect on the departure size of the virtual mass in the surrounding liquid is negligible at one gravity. The initiation, growth and departure criterions are each experimentally checked and used to compute the heat transfer near the knee of the boiling curve using only an experimental determination of the number of bubbles as a function of wall superheat and other known quantities. (Author)

AD-274 572 Div. 20, 30, 15
(TISTP/MFA) OTS price $2.25

National Aeronautics and Space Administration, Washington, D. C.
A MONTE CARLO STUDY OF RESONANCE ESCAPE PROBABILITY IN HETEROGENEOUS SLAB LATTICES CONTAINING RESONANT ABSORBERS AND SCATTERERS,
by Harold Schneider, Leo Levitt, and Kevin J. Sroub. Apr 62, 94p. incl. illus. tables, 9 refs.
(Technical note D-1184)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1184.

DESCRIPTORS: (*Numerical methods and procedures, Statistical analysis, *Probability.) (Computers, *Computer logic, Coding.) (*Neutron scattering, Lattices, Resonance, Absorption, Energy.) (Neutron cross sections for Tungsten and Gold.) (Research reactors modified by Water, Beryllium compounds, Oxides, Lithium compounds, Hydrides.)

Resonance escape probabilities for heterogeneous semi-infinite slab lattice systems were computed by the Monte Carlo method in the energy range

1 kilo-electron-volt to 0.125 electron volt. Absorber-moderator combinations considered were W-H2O, W-LiH, W-BeO, Au-H2O, Au-LiH, and Au-BeO. Absorber and moderator thickness and absorber temperature were varied in a parametric study. The Monte Carlo results of neutron absorption for various thicknesses of tungsten and gold slabs at room temperature are in good agreement with previous experimental results. The calculations show the dominating influence of resonance peaks in the absorption of thin samples. With increasing thickness this peak absorption saturates out, and considerably more absorption occurs in the wings of the resonances. Strong resonance scattering in several tungsten resonances results in greater self-shielding than would exist if the scattering were absent. (Author)

AD-274 671 Div. 20, 4
(TISTM/EJH) OTS price $3.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
INVESTIGATION OF H4 AND L14 FOR ASTROPHYSICAL APPLICATIONS.
Final rept., Jan 61-Mar 62,
by W. L. Imhof, F. J. Vaughn and others. Mar 62, 41p. incl. illus. 10 refs.
(Contract AF 29(601)1765)
(AFSWC TDR 62-26) Unclassified report

DESCRIPTORS: (*Hydrogen, *Helium, *Lithium, *Radioactive isotopes, Production by Neutron bombardment, Proton bombardment, Deuteron bombardment, Nuclear reactions, Detection, Gamma rays, Alpha particles, Isotopic cross section, Half life, Beta decay.) (Isotopes, Astrophysics.)

A search for H-4 and Li-4 was made by looking for radioactivities produced in the following reactions: He-3 (p,gamma) Li-4, He-3 (d,n) Li-4, H-3 (d,p) H-4, H-3 (n,gamma) H-4, and Li-7 (n,alpha) H-4. The possible existence of Li-4 was also studied by direct observation of the gamma rays produced in the He-3 (p,gamma) Li-4 reaction. In none of the measurements was any evidence seen for the existence of Li-4 or H-4. From the activation runs, upper limits to the cross sections were obtained as a function of lifetime, for half-lives extending from as short as 10 to the -6th power seconds to as long as 10 to the 5th power seconds. The various reactions were investigated over different portions of the half-life range. The results obtained provide evidence that neither Li-4 nor H-4 is particle-stable.

AD-274 685 Div. 20, 14
(TISTM/EJH) OTS price $2.60

Rock Island Arsenal Lab., Ill.
SYNTHESIS OF CASTABLE ELASTOMERS FOR NEUTRON SHIELDING,
by L. G. Wiedenmann. 6 Mar 62, 23p. incl. tables, 24 refs. (Rept. no. 62-788)
(DA Proj. 548-03-003)
Unclassified report

DESCRIPTORS: (*Shielding, *Reactor shielding materials, Neutrons by *Elastomers, Organoboranes, Polymers, Dienes, Alkyl radicals, *Decaboranes, Stability, Casting, Hydrogen, Density, Aging.)

Boron-containing polymers were synthesized as candidates for a castable neutron shielding material. Alkyldecaborane polymers were the most promising. Polyesters of boric acid or alkylboronic acid, boron terminated polydienes, or boronated liquid polybutadiene had poor hydrolytic or oxidative stability, or poor curing characteristics. (Author)

AD-274 704 Div. 20
(TISTP/FR) OTS price $1.60

Aerospace Corp., El Segundo, Calif.
OMNIDIRECTIONAL SOLID STATE PROTON SPECTROMETER.
Semiannual technical rept., 1 July-31 Dec 61,
by Stanley C. Freden and George A. Paulikas. 28 Feb 62, 13p. incl. illus. table (Rept. no. TDR-930(2260-22)TR-1)
(Contract AF 04(647)930)
(DCAS TDR 62-73) Unclassified report

DESCRIPTORS: (Detectors, Lithium, Pulse amplifiers, Trigger circuits.) (Protons, Fluxmeters.) *Proton counters.

A wide angle proton spectrometer using solid state detectors was developed. The spectrometer will measure the proton flux and differential energy spectrum from 10 to 100 mev and the integral flux above 100 mev over a solid angle of at least 2 pi. Modular design has been followed to optimize the flexibility of the system, making it suitable for measurements of proton fluxes in various regions of the lower Van Allen Zone. (Author)

AD-274 759 Div. 20
(TISTP/TL) OTS price $2.60

Strasbourg U. (France).
RESEARCH ON EXCITED LEVELS IN LIGHT NUCLEI USING 1.5 MeV C-W.
Technical rept. on Experimental Study of the Double Gamma Emission in the Monopole Transitions of the Nuclei 16O, 40Ca and 90Zr,
by Serge Gorodetzky. 31 Jan 62, 22p. incl. illus. table, 18 refs.
(Contract AF 61(052)478)
(AFOSR-2531) Unclassified report

DESCRIPTORS: (*Nuclear physics, *Electromagnetic fields, *Nuclear energy levels, *Nuclei, Excitation, *Gamma rays, Theory, Probability of Nuclear models.) (Electrons, Photons, Isotopes, Radioactivity.) (Oxygen, Calcium, Zirconium, Fluorine, Strontium.)

The double Gamma emission was studied in the monopole transitions of energy 6.06 MeV in 16O, 3.35 MeV in 40Ca and 1.73 MeV in 90Zr, obtained from the reactions 19F (p Alpha) 16O and 40Ca (pp') 40Ca, and by Beta(-) radioactivity of a 90Sr source, respectively. In the case of 16O, the value T(Gamma Gamma) over T sub tot equals (2.5 ± 1.1) x 1/1000 is found. For 40Ca and 90Zr upper limits of 2.4 x 1/1000 and 1/4 x 1/1000 respectively were obtained. Comparisons with theoretical predictions and other experimental values are given. (Author)

AD-274 798 Div. 20
(TISTM/GEC) OTS price $1.60

California U., Berkeley.
THERMOLUMINESCENCE OF SOLID NITROGEN AFTER ELEC-

TRON BOMBARDMENT AT 4.2 K,
by Brian Brocklehurst and George C. Pimentel.
31 Aug 61, 17p. incl. table.
(Contract AF 49(638)944)
(AFOSR 1375)
Unclassified report

DESCRIPTORS: (Excitation by *Electron bombardment of Solids, *Nitrogen causing *Luminescence.) Diffusion theory, Low temperature research.

Solid N annealed at 20 K and then bombarded with electrons at 4 K gives 3 glow peaks on warming, at 10, 14.5, and 19 K. Unannealed N gave broader peaks. A feeble, long-lived glow followed the normal afterglow after bombardment at 4 K. Thermal effects during warming were observed in one apparatus with radiation shielding at 77 K but they were not observed in a much more sensitive apparatus with radiation shielding at 4 K. The thermal effects were probably caused by an anomalous vapor pressure and loss of Dewar vacuum. The data are discussed with reference to 2 interpretations, the storage of supercript 2D excited N atoms and the recombination of superscript 4S atoms through diffusion. The latter explanation is preferred and a simple model is offered to account for the diffusion activation enthalpies implied by the 3 thermoluminescence peaks. (Author)

AD-274 818 Div. 20
(TISTP/TL) OTS price $4.60

Maryland U., College Park.
A FIELD THEORETICAL CALCULATION OF THE ONE-PION-EXCHANGE AND TWO-PION-EXCHANGE CONTRIBUTIONS TO THE PHASE SHIFTS WITH HIGHER ANGULAR MOMENTA FOR NUCLEON-NUCLEON SCATTERING,
by Iwao Sato. Jan 62, 44p. incl. illus. tables, 21 refs. (Technical rept. no. 238)
(Contract AF 49(638)24)
(AFOSR-2117) Unclassified report

DESCRIPTORS: (*Nucleons, Scattering, Theory and *Pions, Resonance.) (Numerical analysis, Matrix algebra, Series, Green's function, Integral equations, Integral transforms.) (*Nuclear physics, Phase studies.)

The one-pion-exchange and two-pion-exchange parts of the S-matrix for nucleon-nucleon scattering are calculated field-theoretically. The rescattering of virtual pions by nucleons and the pion-pion interaction between virtual pions are taken into account The S-matrix is then decomposed into the partial-wave amplitudes, and the phase shifts are calculated. Numerical evaluations are carried out for the 310-Mev proton-proton scattering, and the results are compared with the phase shifts obtained by analyzing the experimental data. Without contribution of the pion-pion interaction, the results are far from agreement with experiment because of too strong attraction arising from the contributions of the two-pion-exchange part, but the contribution of the pion-pion resonance in the I equals J equals 1 state improves the results considerably by largely cancelling the attraction. Definite discrepancies remain between the theory and the experiments, and some unknown effects must play important roles in determining the nuclear force in the region of the internucleon distance around the Compton wave length of the pion. (Author)

21. NUCLEAR PROPULSION

AD-274 731 Div. 21, 17
(TISTP/JW) OTS price $2.60

Engineering Supervision Co., New York.
INVESTIGATION OF STRESS DISTRIBUTION AND STRENGTH CHARACTERISTICS OF LOAD MAGNIFICATION ANVILS FOR ULTRA HIGH PRESSURE APPARATUS.
Quarterly scientific rept. no. 5, 1 Jan-31 Mar 62. 31 Mar 62, 6p. illus.
(Contract AF 19(604)7438; In cooperation with New York U. Coll. of Engineering, N. Y.)
(AFCRL 62-179) Unclassified report

DESCRIPTORS: (*Forge presses, Carbides, Tungsten compounds, Cobalt, Physical properties, Stresses, Tests, Design, Configuration.) (Load distribution, *Photoelasticity.)

This report includes:
New York U. Coll. of Engineering, N. Y.
PHOTOELASTIC INVESTIGATION OF A TETRAHEDRAL PRESS WITH MODIFIED GASKETING, by Gerald Gurtman and Herbert Becker. Mar 62 (Technical rept. no. SM 62-2)
(Subcontract to Engineering Supervision Co., New York, Contract AF 19(604)7438)
A tetrahedral press was investigated for the effect of corner starvation of the extended gasket. The results reveal the peak value of Tau(max) to occur slightly below the anvil face at the corner. A similar result was obtained upon reexamination of the model in the previous anvil study, although Tau(max) was found to be lower in that case than in the present study. (Author)

22. ORDNANCE

AD-274 511 Div. 22
(TISTW/RD) OTS price $4.60

Aerojet-General Corp., Downey, Calif.
INVESTIGATION OF HIGH EXPLOSIVES AT ELEVATED TEMPERATURES. VOLUME II: EXPERIMENTAL TECHNIQUES.
Final rept.,
by K. N. Kreyenhagen and J. P. Joyce. Apr 62, 47p. incl. illus. tables, 9 refs. (Rept. no. 0136-02(12)FP, vol. 2)
(Contract NOrd-17881)
Unclassified report

DESCRIPTORS: (*Explosives, *Temperature, Safety, Hazards, *Explosive trains.) (Explosives, Heating, Remote control systems, Tests, Test equipment, Test methods.) (Explosives, Stability, Sensitivity, *Temperature control, Thermal expansion.)

Contents:
Special safety precautions
Large-scale thermal stability test
Shock-sensitivity test
Drop-impact test
Bullet-sensitivity test
Detonation-velocity measurement
Thermal expansion
Thermal diffusivity

Division 23 - PERSONNEL AND TRAINING
Division 24 - PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-274 517 Div. 22
(TISTW/RD) OTS price $8.60

Food Machinery and Chemical Corp., San Jose, Calif.
WATER FORDING AND SUBMERGED OPERATION OF ORDNANCE COMBAT VEHICLES.
Final rept.,
by O. M. Rice and B. V. Hunter. 28 Feb 61, iv. incl. illus. 96 refs.
(Contract DA 04-200-ORD-1105)
Unclassified report

DESCRIPTORS: (*Tanks, *Armored vehicles, *Tracked vehicles.) (*Underwater navigation, Snorkel, Underwater communication systems, Flotation.)

Feasibility studies were made of techniques and processes for providing ordnance combat vehicles with the capability of traversing rivers and minor water impoundments. The tactical and technical problems encountered in providing the vehicle with this capability by three different methods were considered: (1) by flotation on the surface of the barrier; (2) as a submarine (capable of floating on the surface, operating under the surface by flotation, and crawling on the bottom); and (3) by traversing the bottom of the barrier. On the basis of the information and concepts considered it was concluded that the bottom-crawling concept is the most feasible of the three concepts considered because the least amount of equipment is required and this equipment has the least effect on the mobility and firepower of the vehicle. (Author)

23. PERSONNEL AND TRAINING

No Entries

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-274 564 Div. 24, 12
(TISTP/FR) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
THE ARCTIC METEOROLOGY PHOTO PROBE,
by Harold E. Evans, Robert C. Baumann, and Richard J. Andryshak. Feb 62, 33p. incl. illus. tables, 2 refs. (Technical note D-706)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-706.

DESCRIPTORS: *Sounding rockets. (Clouds, *Aerial photography, Instrumentation.)

From three Aerobee-100 and Aerobee-150 rockets launched at Fort Churchill, Canada, in September and October, 1960, high resolution photographs of a vigorous low-pressure disturbance were obtained at altitudes up to 140 miles. These photographs have provided a basis for studying cloud brightness and have shown the advisability using similar rockets in conjunction with weather satellites. Infrared film and a Wratten 88-A filter produced the best pictures, with a camera setting of 1/500 second at f/8.0.

AD-274 613 Div. 24, 2
(TISTA/VGW) OTS price $5.60

Syracuse U. Research Inst., N. Y.
A COMPARATIVE ANALYSIS OF PHOTO COORDINATES MEASURED STEREOSCOPICALLY AND MONOCULARLY,
by Dean C. Merchant and Robert H. Brock.
Dec 61, 56p. incl. illus. tables, 4 refs. (Rept. no. CE 841-6112F)
(Contract AF 30(602)2369, Proj. 5569)
(RADC TDR 62-101) Unclassified report

DESCRIPTORS: (Tests of Optical instruments including *Stereoscopic map plotters for *Mapping from Aerial photographs.)

A comparison is made between the accuracies of photo coordinates measured on a monocular comparator and stereocomparator. Methods are derived based on the reseau type photograph and the method of least squares to transform from comparator coordinates to photo coordinates correcting for rotation, transverse and longitudinal film shrinkage and lens distortion. An analysis of the data based on approximately 70 independent adjustments indicates that the monocular comparator will yield adjusted coordinate accuracies slightly superior to those of the stereocomparator when working with reseau type photography. The consistently smaller standard errors of x coordinates as compared to the y coordinates leads to the recommendation for weighting of the measurements for either of the two comparators used during the investigation. (Author)

25. PHYSICS

AD-274 471 Div. 25, 15
(TISTP/MFA) OTS price $1.60

Diamond Ordnance Fuze Labs., Washington, D. C.
LONG RANGE ORDER OF A LINEAR ANTIFERROMAGNETIC CHAIN,
by Clyde A. Morrison, N. Karayianis, and D. Wortman. 30 Mar 62, 23p. 7 refs. (DOFL rept. no. TR-1018)
(Proj. DA-5N06-01-014)
Unclassified report

DESCRIPTORS: (*Antiferromagnetism, *Magnetic susceptibility, Measurement.) (Particles, *Nuclear spins, Lattices, Quantum mechanics.) (Operators (Mathematics), Transformations (Mathematics), Matrix algebra, Linear systems.)

Results of a study made on long range order in the ground state of a linear antiferromagnetic chain are reported. A chain of N identical spin 1/2 particles coupled by the anisotropic Hamiltonian is considered. The periodic boundary conditions are imposed so that the chain may be considered a loop of particles. An operator is introduced, which rotates the particles in the loop so that each particle moves to the next highest site number. It is proved that simultaneous eigenstates have no long range order as previously measured. The ground state of the Hamiltonian is shown to be nondegenerate. (Author)

AD-274 472 Div. 25, 30
(TISTP/JW) OTS price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
EQUIVOCATION OF BINARY, NULL-ZONE, AND OPTIMUM DETECTORS FOR RAPIDLY FADING TRANSMISSIONS,
by John N. Pierce. Jan 62, 25p. incl. illus. table, 5 refs. (Rept. no. AFCRL 62-42)
(Proj. 4610) Unclassified report

DESCRIPTORS: (*Data transmission systems, Communication systems, Communications theory, Information retrieval.) (Computer logic, *Detection, Reliability, Probability.)

The efficiency of information extraction has been determined for binary detection, null-zone detection and optimum detection of certain rapidly fading transmissions. Results are presented in graphical and tabular form, and as asymptotic expressions. Relative merits of the three detection methods are discussed. (Author)

AD-274 473 Div. 25
(TISTW/RD) OTS price $1.60

E. M. I. Electronics, Ltd. (Gt. Brit.).
NOISE IN LOW-TEMPERATURE INDIUM ANTIMONIDE PHOTOCONDUCTIVE CELLS,
by D. G. Lloyd and H. S. Owen. Dec 61, 6p. illus. tables (Rept. no. DP 1115)
Unclassified report

DESCRIPTORS: (*Photoelectric cells, Indium compounds, Antimonides, *Noise, Photoconductivity.) (Low temperature research, Liquefied gases, Nitrogen.)

This report gives an account of a short experimental study of the noise power spectrum of low-temperature indium antimonide photoconductive cells within the frequency range 20 c to 5 kc. The results from 10 cells showed that the noise power spectrum was of the form P varies as 1/f to the nth power below a certain frequency f sub b and a constant value above this frequency. Values for n and f sub b are presented. It was found that variation of the polarizing current through the cell changed the magnitude but did not alter the shape of the power spectrum, but that a microphonic effect which was induced by faulty cooling produced a marked increase in the value of n. (Author)

AD-274 488 Div. 25, 15
(TISTP/TL) OTS price $1.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
THE FORCE ON A MOVING DISLOCATION,
by Alan N. Stroh. Mar 62, 17p. incl. illus. (Technical rept. no. 169)
(Contract Nonr-184110, Proj. NR-018-801)
Unclassified report

DESCRIPTORS: (*Partial differential equations and *Integration of the *Elasticity, Theory of *Solids.) (*Mechanics, Shear stresses, Load distribution, Deformation, Dynamics, Potential theory, Kinetic theory.) (*Solid state physics, Crystals, Metallic crystals.)

A Lagrangian formulation is used to discuss the nature of the force on a moving dislocation. Whether or not a Lorentz force appears depends on the definition of force adopted, but it is shown that this force can give rise to no physical effects; a definition which does not introduce it is therefore recommended. The force is given by the usual static expression (F = sigma b) and is independent of the motion of the dislocation. (Author)

AD-274 498 Div. 25, 17, 14
(TISTM/BRW) OTS price $4.60

New York U., N. Y.
ELECTRONIC PROPERTIES OF SOME INTERMETALLIC COMPOUNDS.
Final rept. for Jan 60-May 61, on Solid State Research and Properties of Matter,
by E. Miller, D. Seidman and others. Dec 61, 34p. incl. illus. tables, 26 refs.
(Contract AF 33(616)3883, Proj. 7021)
(ARL-131) Unclassified report

DESCRIPTORS: (*Intermetallic compounds, Semiconductors, Crystals, Single crystals, *Thermoelectricity, *Lead compounds, Barium compounds, Tin compounds, *Tellurides, *Selenides, Electrical properties, Resistance, Hall effect, Phase studies.) Solid state physics, Electronics, Alloys.

Additional analysis of the data for the PbTe system shows that the disparity in energy gap values for PbTe as determined from optical and thermal measurements may be explained by generation of excess carriers due to defect generation at elevated temperatures. An analysis of activation processes involved points to Pb interstitials as the most likely defect present. BaSe and BaTe can be prepared by direct reaction of Ba with Se and Te. The binding energies of these compounds is high as evidenced by their high melting points and high resistivity at room temperature, indicating that both would have rather high energy gaps. On examination of the PbSe phase diagram by thermal analysis and metallographic techniques it was determined that: (1) the melting point of PbSe is 678.3 C, (2) a

monotectic reaction occurs on the Se rich side of PbSe, but does not occur on the Pb rich side of PbSe. Measurements of electronic properties of PbSe indicated that: (1) stoichiometric PbSe does not melt at the maximum melting point but the maximum melting point occurs at a composition containing 0.009 at-% Se, and (2) the energy gap as determined from resistivity and Hall effect as a function of temperature is greater than that reported from optical measurements. (Author)

AD-274 504 Div. 25, 4, 8, 14
(TISTE/CAM) OTS price $7.60

Naval Ordnance Lab., Corona, Calif.
FOUNDATIONAL RESEARCH PROJECTS.
Quarterly rept., Oct-Dec 61.
1 Mar 62, 76p. incl. illus tables.
(NAVWEPS rept. no. 7214)
Unclassified report

DESCRIPTORS: (*Thin films, Crystals, Ferromagnetic materials, Damping, *Ferromagnetism, Theory, Mathematical analysis.) (*Scientific research, *High temperature research, Metalorganic compounds, Polymerization, Polymers, Phosphonitrile chlorides, Lithium, Azides, Benzenes, Nitrobenzenes, Phosphorus compounds, Ammonia.) (Infrared spectroscopy, Interferometers, Spectrographic analysis, Germanium, Electrochemistry, Storage batteries, Electrolytes, Electrodes, Cathodes (Electrolytic cell), Anodes (Electrolytic cell), Platinum, Steel, Silver, Copper, Nickel.) (*Semiconductors, Differential equations, Matrix algebra.) (Antennas, *Guided missile antennas, Superhigh frequency, *Slot antennas, Coupled antennas, Measurement of Antenna radiation patterns.) (Nonlinear systems, Transmission lines, Wave transmission, Electromagnetic waves, Propagation, Plasma physics, *Rare gases, Partial differential equations, Vector analysis, Electric fields, Conductivity, Magnetic fields, Electrons.)

AD-274 510 Div. 25, 14
(TISTM/BRW) OTS price $3.60

Arizona State U., Tempe.
ELECTRICAL PROPERTIES OF OXIDES OF SOME LANTHANIDE RARE EARTH ELEMENTS.
Final rept.,
by Clement J. Kevane. 28 Feb 62, 35p. incl. illus. 12 refs.
(Contract AF 49(638)789)
(AFOSR-2230) Unclassified report

DESCRIPTORS: (Solid state physics, *Ceramic materials, Rare earth compounds, *Cerium compounds, *Praseodymium compounds, Lanthanum compounds, Oxides, Electrical properties, Measurement, Transients, Electrical conductance, Electric currents, Electric potential, Temperature (20 to 600 C).) (Microbalances, Frequency, Oxygen, Transport properties.)

Electrical conduction was studied in ceramic CeO2 and Pr2O3 from room temperature to near 600 C. Measurements were primarily 2-contact direct current type although some 2-contact ac measurements were made on CeO2. Some electrical conductivity effects of departures from stoichiometry were studied in Pr2O3 and CeO2 using a quartz-beam microbalance. At temperatures between 400 and 600 C, the current which flows between Pt electrodes through CeO2 at constant applied potential showed a decreasing transient Above 600 C, the low-bias transients became increasing transients and at intermediate biases the transients disappeared. The ac resistance and capacitance of CeO2 ceramic pellet with Pt electrodes were strongly frequency dependent. The ac sample resistance decreased with frequency as did the capacitance. At low frequency the capacitance became very large and if this capacitance were considered to be a bulk material effect it would correspond to a very large dielectric coefficient at frequencies near 100 C. Sintered ceramic pellets of CeO2 containing 1% CaO appeared to exhibit ionic conduction and electrolysis under the action of an applied dc potential. (Author)

AD-274 515 Div. 25
(TISTM/EJH) OTS price $1.60

Cornell U. Graduate School of Aeronautical Engineering, Ithaca, N. Y.
INVESTIGATION OF CONDENSATION PROCESSES BEHIND NORMAL SHOCKS BY OPTICAL METHODS--A FEASIBILITY ANALYSIS,
by Y. Timnat and S. H. Bauer. Mar 62, 20p. incl. illus. table, 15 refs. (Rept. no. CU-7356)
(Contract AF 49(638)716)
Unclassified report

DESCRIPTORS: (Solids, *Particles, Detection by Light, Scattering, Intensity, Photoemission, Refractive index, *Optical analysis.) (*Gases, *Condensation, Shock tubes, Measurement.) (Feasibility studies, Theory.)

Detection of solid particles formed in a shock tube by thermal decomposition, methods for determining the induction time for the initial condensation, the number of particles formed per unit volume, and their rate of growth are discussed. Optical methods of detection seem most promising. The use of the index of refraction, the emissivity of light, and the amount of latent heat released are considered. Examples of substances proposed for study are C6H6, which yields C particles upon thermal decomposition in a mild shock, Pb(C2H5)4 which generates Pb particles as well as some C, and chromium carbonyl, which gives only Cr. The principles of light scattering by small particles with their application to condensation problems in a shock tube are considered. (Author)

AD-274 528 Div. 25, 8
(TISTP/MFA) OTS price $3.60

Radiation Lab., U. of Michigan, Ann Arbor.
STUDIES IN NON-LINEAR MODELING-IV: FAR FIELD SCATTERING BY SIMPLE SHAPES AT LOW FREQUENCIES.
Final rept.,
by R. E. Kleinman, R. D. Low, and F. B. Sleator.
Feb 62, 34p. 16 refs. (Rept. no. 4405-1-F)
(Contract AF 19(604)8030, Proj. 4600; Continuation of Contract AF 19(602)4993)
(AFCRL 62-108) Unclassified report

DESCRIPTORS: (*Scattering, *Electromagnetic waves, *Targets, *Low frequency.) (Quantum mechanics, Partial differential equations, Polynomials, Metamathematics, Nonlinear systems.)

The effort on the problem of scattering by complicated shapes is part of a long range program, the ultimate goal of which is the theoretical determination of the electromagnetic (and acoustic) scattering properties of an arbitrarily shaped target to any desired degree of accuracy. Though this goal may never be fully attained,

considerable activity, both in the Radiation Laboratory and in the field in general, has produced a variety of approximate techniques as well as exact solutions, thus considerably enlarging the class of shapes whose scattering properties can be said to be known. One concern has been refining techniques applicable for low frequencies (wavelength large with respect to scatterer) to extend their range of validity. This effort has met with considerable success. (Author)

AD-274 541 Div. 25
(TISTP/MFA) OTS price $10.50

Energy Conversion and Semiconductor Lab., Mass. Inst. of Tech., Cambridge.
THE EFFECTIVE MASSES OF FREE CARRIERS IN PbTe: THEIR TEMPERATURE DEPENDENCE AND CONTRIBUTION TO TRANSPORT PROPERTIES,
by Henry A. Lyden. 15 Jan 62, 131p. incl. illus. tables, refs. (Scientific rept. no. 7)
(Contract AF 19(604)4153)
(AFCRL 62-129) Unclassified report

DESCRIPTORS: (*Transport properties in *Semiconductors of Lead, *Tellurium compounds.) (Magnetic fields, *Thermal conductivity, Temperature, Measurement, Thermoelectricity.) (Scattering, Relaxation time, Lattices.)

The temperature dependence of the mobility of the semiconducting compound PbTe has posed something of a problem in that it apparently does not conform to the theoretical behavior. The origins of this behavior are presented in this investigation. A procedure was developed to determine the conductivity effective mass from the wavelength of the infra-red reflectivity minimum resulting from the free-carrier dispersion. The conductivity effective mass was determined as a function of temperature for (5) samples of lead telluride. A very pronounced temperature dependence was observed. In addition, the thermoelectric power has been measured between 77 and 300 K for these five samples. From these data, the reduced Fermi potential energy and the density-of-states effective mass were determined over this same temperature range. An acoustical mode mobility also has been synthesized from these data. From the amount of optical mode scattering required to fit the observed mobility behavior, it has been deduced that PbTe should not be classified as a predominately polar compound since it has a very low degree of ionicity. Finally, the thermal conductivity of these same samples of PbTe has been measured between 100 and 300 K. (Author)

AD-274 553 Div. 25
(TISTM/EJH) OTS price $3.60

Hebrew U. (Israel).
HYPERFINE INTERACTIONS IN THE 2+ ROTATIONAL STATE OF Dy-160 IN DYSPROSIUM IRON GARNET,
by R. Bauminger, S. G. Cohen and others. Feb 62, 25p. illus. 19 refs. (Technical note no. 6)
(Contract AF 61(052)347)
(AFOSR-2535) Unclassified report

DESCRIPTORS: (*Dysprosium, Iron compounds, *Garnet, *Hyperfine structure, Quadrupole moments, Electron transitions, Quantum mechanics, Nuclear states, Nuclear spins, Nuclear resonance, Nuclear magnetic moments, Excitation, Low temperature research.) (Spectrographic analysis, Gamma rays, Absorption.) Isotopes.

The hyperfine interactions of the 2+ rotational level of Dy-160 at 87 kev in dysprosium iron garnet were measured at 94 K using the technique of Mossbauer absorption. A comparison with previous similar measurements in Dy-161 together with the knowledge of the g factor of the Dy-161 ground state from spin resonance experiments gave a value of 0.48 ± 0.07 for the g factor of the 2+ rotational level of Dy-160. The sign of the spectroscopic quadrupole moment of this state was negative. The ratio of quadrupole moments Q sub 160 (2+)/Q sub 161 (ground state) was -0.77 ± 0.25. Comparing a model dependent estimate of Q sub 160(2+) with a value of Q obtained from the experimental results, a value of about 0.2 is obtained for the Sternheimer shielding factor. (Author)

AD-274 570 Div. 25
(TISTP/TL) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
THE MAGNETIC FIELD ON THE AXIS OF CIRCULAR CYLINDRICAL COILS,
by David E. Morris and Robert A. Kilgore. Apr 62, 17p. incl. illus. 3 refs. (Technical note D-1013)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1013.

DESCRIPTORS: (*Magnetic fields, Intensity studies along the axis of *Coils, *Solenoids.)

The magnetic-field intensity along the axis of circular cylindrical coils of finite winding thickness has been computed for a range of coil geometries. Nondimensional field plots are presented that facilitate coil design for a desired field intensity along the axis. (Author)

AD-274 615 Div. 25, 4
(TISTP/JW) OTS price $1.10

Unified Science Associates, Inc., Pasadena, Calif.
STABLE DENSE COLD PLASMA.
Semiannual summary rept. for period ending 19 Feb 62,
by S. Naiditch. 19 Feb 62, 4p. incl. illus.
(Contract Nonr-343700)
Unclassified report

DESCRIPTORS: (*Gases, Gas ionization, Metals, Solvates, Vapors, Ionization, Ions.) (Solvent action, *Ammonia, Chemical reactions, Physical properties, *Temperature coefficient of reactivity, Thermodynamics.) (Solutions, Sodium, Ammonia.)

Gaseous solutions have been prepared using gaseous ammonia as the solvent and metallic sodium as the solute. Continuing progress has been made in increasing the lifetime of these solutions from a few seconds to 52 minutes by improvements in techniques of preparing solutions in a state of high purity. Electrical conductivities of the liquid solutions were measured inductively from room temperature to 160 C. The resistivities of the liquid solutions of sodium and ammonia drop as the temperature is increased. Minima in resistivities are found at 80-100 C, where the resistivities of concentrated liquid solutions are below 200 micro ohm cm. The functional dependence of the resistivities at temperatures above 100 C in the liquid state has not been established. Temperatures were raised almost to the critical points of some of the solutions before rupture of the containers occurred. (Author)

AD-274 627 Div. 25
(TISTP/MFA) OTS price $1.60

University of Southern Calif. Engineering Center, Los Angeles.
THE CRITERION OF RAREFACTION OF PLASMAS,
by Toyoki Koga. Mar 62, 8p. incl. illus. (USCEC rept. no. 83-212)
(Contract AF 49(638)831, Proj. 9783)
(AFOSR-2361) Unclassified report

DESCRIPTORS: (*Plasma physics, Particles, *Electromagnetic effects, Diffusion, *Transport properties.) (Physical properties, Density, Energy, Temperature.)

According to the analysis of kinetic equations of particles in plasmas given in a previous report (On Transport Processes in a Plasma (Kinetic Equation for a Plasma), ''AFOSR 1744, USCEC Rept 83-209, October 1961.), rarefaction of a plasma is defined. The criterion of rarefaction is divided into two parts: one is the condition of the discrete binary interactions of particles which permits us to define a free path; the other is the comparison between the mean free path and a representative dimension of the field (the Knudsen number). The first condition is determined by the number density of particles and the temperature (the average energy of random motions of particles). In the regime of rarefaction, the basic kinetic equations are of the Boltzmann type. (Author)

AD-274 628 Div. 25, 12
(TISTP/JW) OTS price $7.60

United States Rubber Co., Wayne, N. J.
CONSTRUCTION AND TESTING OF COATINGS FOR DRAG REDUCTION.
Final rept. for Jan 62,
by F. W. Boggs, H. R. Frey, and E. R. Hahn.
1 Feb 62, 77p. incl. illus. tables, 7 refs.
(Contract NOw 60-0227-c)
Unclassified report

DESCRIPTORS: (Hydrodynamics, *Drag, Friction, *Reduction, Damping, Coatings, Elastic shells, *Underwater propulsion, Test methods.) (*Boundary layer, Fluid flow.)

The construction and testing of selected compliant coatings for drag reduction are described. Included are the scaling relations, description of test bodies, types of coatings and methods of construction, testing procedures, the phenomenon of static divergence, qualitative analysis, and conclusions. (Author)

AD-274 629 Div. 25, 15
(TISTP/MFA) OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
MAGNETOHYDRODYNAMIC SHOCK PROPAGATION IN NON-UNIFORM DUCTS,
by Roy M. Gundersen. Dec 61, 21p. incl. illus. 9 refs. (MRC Technical summary rept. no. 287)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: (*Shock waves, *Magnetohydrodynamics, *Ducts, Shock tubes, Compressible flow, Gas flow.) (Perturbation theory, Transformations (Mathematics), Differential equations.)

Perturbation is produced when an initially plane magnetohydrodynamic shock wave encounters an area variation, the problem being linearized on the basis of small area variations. To ensure that all changes in the behavior of the shock are caused by the non-uniform area, it is assumed that the area variations are confined to the region $x > 0$ while to the left of the section x equals 0 (say), the tube is of constant area, and the initially plane shock propagates through this portion with constant speed. The fluid in front of the shock is assumed at rest. When the shock meets the area variation, it is perturbed, the shock strength altered, and the subsequent flow is non-isentropic. There are two distinct contributions to the disturbance, namely, a permanent perturbation caused directly by the area change and a transient disturbance, due to reflection from the shock of the permanent perturbation, which propagates with velocity. (Author)

AD-274 631 Div. 25
(TISTM/EJH) OTS price $1.60

Theoretical Chemistry Lab., U. of Wisconsin, Madison.
CORRELATION SPLITTING IN THE HYDROGEN MOLECULE,
by Ernest R. Davidson and Leon L. Jones.
14 Mar 62, 15p. incl. illus. tables, 7 refs.
(Rept. no. CF-2977, series 3)
(Contract NOrd-15884)
Unclassified report

DESCRIPTORS: (*Hydrogen, *Molecules, Atoms, *Quantum mechanics, Atomic orbitals, Nuclear spins, Energy, *Nuclear shell models, Theory, *Nuclear energy levels.)

The difference between the energy of the best open shell and best closed shell wave functions for the H molecule were calculated for various values of the internuclear distance. Both left-right and in-out correlated functions were considered. The relative importance of the type of correlation reverses at an internuclear distance of 0.8 Bohrs. (Author)

AD-274 632 Div. 25
(TISTM/GEC) OTS price $1.60

Theoretical Chemistry Lab., U. of Wisconsin, Madison.
SOME REMARKS ON THE THEORY OF FLAME PROPAGATION,
by Joseph O. Hirschfelder. 4 Apr 62, 14p.
11 refs. (Rept. no. CM-1016, series 8)
(Contract NOrd-15884)
Unclassified report

DESCRIPTORS: (*Flame propagation, Theory, Thermodynamics, Reaction kinetics, Flames.)

The principal problems and the salient features of the theory of flame propagation are discussed in a qualitative manner. (Author)

AD-274 643 Div. 25, 12, 17
(TISTP/MFA) OTS price $3.60

Aerospace Corp., El Segundo, Calif.
BASIC RESEARCH PROGRAM. RAIL GUN.

Semiannual technical rept., 1 July-31 Dec 61, by W. R. Grabowsky. 28 Feb 62, 27p. incl. illus. 6 refs. (Rept. no. TDR-930(2270-20)TR-1, Vol. 2)
(Contract AF 04(647)930)
(DCAS TDR 62-13, Vol. 2) Unclassified report

DESCRIPTORS: (*Wire, *Detonation, *Propulsion, *Propellants, Gas discharges, Satellite vehicle research.) (Instrumentation, Photomultipliers, *Schlieren photography, Spectrographic cameras.) (Feasibility studies, Tests.)

The performance of a rail gun propulsion system is examined from the standpoint of a satellite attitude control device. Estimates of the propulsive performance of the gun are made which are related to a rotation and angular acceleration that could be imparted to a given satellite. Some results are presented that would allow for a weight estimation of a specific system. Finally, some preliminary experimental data relative to the propulsive capability of the rail gun are presented. (Author)

AD-274 644 Div. 25
(TISTP/MFA) OTS price $3.60

Aerospace Corp., El Segundo, Calif.
ENERGY CONVERSION PROGRAM. MAGNETOHYDRODYNAMIC GENERATOR.
Semiannual technical rept., 1 July-31 Dec 61, by W. R. Grabowsky. 23 Feb 62, 30p. incl. illus. 11 refs. (Rept. no. TDR-930(2220-40)TR-1)
(Contract AF 04(647)930)
(DCAS TDR 62-32) Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, Vortex generators, Feasibility studies, Tests, Design.) (Energy, Temperature, *Heat transfer, Pressure, Electrical conductance, Gas ionization.) (Tensile properties of Tantalum.)

Material studies that will eventually lead to the design and study of a magnetohydrodynamic (MHD) vortex generator for use in a closed-cycle power conversion system have been designed in detail, experimental facilities were constructed, and tests are now being initiated. The tensile strength properties of tantalum, up to its melting point (3269 K), are being investigated. (Author)

AD-274 645 Div. 25
(TISTP/MFA) OTS price $3.60

Aerospace Corp., El Segundo, Calif.
EQUILIBRIUM SOLUTIONS OF A PLANE ELECTRON BEAM IN A PLASMA,
by Chieh Chien Chang and Thomas S. Lundgren. 1 Feb 62, 32p. incl. illus. 6 refs. (Rept. no. TDR-930(2230-05)TN-4)
(Contract AF 04(647)930)
(DCAS TDR 62-42) .Unclassified report

DESCRIPTORS: (*Plasma physics, *Electron beams, *Particles, Electrons, Ions in Magnetic fields, Transport properties.) (Temperature, Pressure, Energy.) (Transformations (Mathematics), Hydrodynamics, Equations, Partial differential equations.)

Equilibrium solutions of an electron beam injected into a plasma are considered. This is a preliminary step in studying the stability of the so-called E-layer of the Astron thermonuclear reactor. The model consists of a plane sheet of streaming electrons in a homogeneous plasma. Equilibrium solutions are obtained from the collisionless Boltzmann equations for three fluids: one of stream electrons, another of plasma electrons, and a third of plasma ions. Two important cases are treated in this manner: cold plasma and cold beam. The distribution of beam electrons, plasma ions, and plasma electrons is presented. (Author)

AD-274 655 Div. 25
(TISTP/TL) OTS price $5.60

General Electric Co., Schenectady, N. Y.
THE LOAD CARRYING CAPACITY AND STABILITY OF HYBRID GAS BEARINGS,
by L. W. Winn and B. Sternlicht. 11 Mar 62, 55p. incl. illus. tables, 13 refs. (Technical rept. no. R62AT8)
(Contract Nonr-284400)
Unclassified report

DESCRIPTORS: (Hybrid, *Gas bearings, Tests, Load distribution and Stability on Dynamics, Rotation.) (Orifices, Pressure.)

Experimental and theoretical analyses of external pressure bearings were conducted. The effect of shaft rotation on the performance of the bearings was considered. Four types of rotation instabilities with effects on the dynamic behavior of the rotor-bearing system are discussed: critical speed, half-frequency whirl, fractional-frequency whirl, and pneumatic hammer.

AD-274 656 Div. 25, 17
(TISTM/BRW) OTS price $4.60

General Dynamics/Convair, San Diego, Calif.
INFLUENCE OF RESIDUAL STRESSES AND STIFFNESS FACTORS ON FATIGUE STRENGTH OF METALS AND STRUCTURES,
by Clarence R. Smith. Mar 62, 37p. incl. illus. 9 refs. (Rept. no. ERR-SD-170; Rept. no. GDC-62-55)
(Contract AF 33(616)8228)
Unclassified report

DESCRIPTORS: (*Metals, *Structures, *Fatigue (Mechanics), Stresses, Deformation.) (Aluminum alloys (7075-T6), Stainless steel (301, A-286), Titanium alloys (8Al-1Mo-1V).) (Metal joints, Riveted joints.) Photoelasticity.

The influence of residual stresses and stiffness factors on fatigue strength of metals and structures is considered. The fatigue of metals and structures is presented as a series of small problems rather than as one large problem. An effort is made to visualize fatigue as taking place in highly-localized areas wherein stresses can be made to behave as though they were acting either at different amplitudes, or at different maximum values, than a direct proportion of their loading would indicate. A method is presented for ascertaining local stresses by fatigue testing a part to failure at such load that localized yielding is assured. A method is also given for estimating fatigue life. This is the method designated by the U. S. Air Force as The Smith Method for Estimating Fatigue Life. Recommendations are made for specific ways to improve the fatigue life of metals and structures through the use of specially-designed high-interference-fit bushings, tapered bolts, thin-auxiliary doublers, tightly-driven rivets, and edge-driven rivets. (Author)

AD-274 665 Div. 25, 9
(TISTP/JW) OTS price $1.60

Johns Hopkins U., Baltimore, Md.
ASYMPTOTIC SOLUTION FOR SINK FLOW IN A STRONG MAGNETIC FIELD.

Rept. on a Cooperative Program of Fundamental Research as Related to Jet Propulsion,
by L. S. G. Kovasznay and F. C. W. Fung. Apr 62, 10p. illus. (Proj. Squid technical rept. no. JHU-19-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., contract Nonr-185825, Proj. NR-098-038)
Unclassified report

DESCRIPTORS: (*Magnetic fields, Fluid flow, Velocity, *Conductivity, Magnetic effects, Compressible flow, *Perturbation theory.) *Magnetohydrodynamics.

For fluid with finite electric conductivity placed in a magnetic field the dissipative term of magnetic origin causes the governing equation to be non-symmetric with respect to source and sink. Sink flow of an incompressible, non-conductive, perfect fluid is spherically symmetric with the velocity falling off according to an inverse square law. If the fluid is endowed with finite electrical conductivity and a strong parallel uniform magnetic field is imposed, the magnetic lines will channel the flow along the preferred direction. Far away from the sink a similarity solution exists. Both the velocity field and the magnetic perturbation field have been computed and they represent an axisymmetrical wake-type configuration. It was found that the velocity on the axis falls off as the width of the wake increases. (Author)

AD-274 666 Div. 25
(TISTP/JW) OTS price $4.60

Johns Hopkins U., Baltimore, Md.
DETAILED FLOW FIELD IN TRANSITION.
Rept. on A Cooperative Program of Fundamental Research as Related to Jet Propulsion,
by L. S. G. Kovasznay, H. Komoda, and B. R. Vasudeva. Apr 62, 24p. illus. 12 refs. (Proj. Squid technical rept. no. JHU-20-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., contract Nonr-185825, Proj. NR-098-038)
Unclassified report

DESCRIPTORS: (Fluid flow, Conductivity, *Laminar boundary layer, Pressure.) (Thermodynamics, Magnetic fields, Velocity.)

The breakdown of the laminar boundary layer on a flat plate with zero pressure gradient was studied by using a 10-channel linearized, d. c. coupled hot-wire system. The detailed instantaneous flow field was mapped out in the breakdown phase of a three-dimensionally excited laminar instability wave. The development of the flow field was followed from the conventional Tollmien-Schlichting waves into the one-spike and two-spike stage in a detailed and quantitative manner. (Author)

AD-274 672 Div. 25
(TISTP/MFA) OTS price $7.60

Princeton U., N. J.
SHOCK TUBE INVESTIGATION OF THE IONIZATION OF CESIUM VAPOR,
by Alan F. Haught. Feb 62, 63p. incl. illus. table, 20 refs. (Technical rept. no. II-30)
(Contract Nonr-185820, Proj. NR 061-020)
Unclassified report

DESCRIPTORS: (*Plasma physics, Gas ionization of *Cesium, Vapors by *Shock tubes.) (Measurement, Temperature, Pressure, Density, Experimental data, Calibration, Instrumentation, Design, Photographic analysis.) (Thermodynamics and Hydrodynamics, Equations.)

A conventional pressure driven shock tube was used to produce ionizing shocks in a uniformly heated test section containing argon and vaporized cesium. The radiation from the shock heated cesium vapor was used to measure the thermal ionization rate of the cesium vapor as a function of temperature and density. A number of significant differences are noted between the results obtained here and those obtained in similar experiments with inert gases. In particular, unlike for the inert gases, the luminosity profile of the ionizing cesium shows a delayed radiation overshoot. The overshoot apparently arises from the two stage nature of the ionization process and, on the basis of a qualitative model for the ionization, permits an experimental evaluation of the temperature and density dependence of both the first stage atom-atom process and the second stage electron-atom reaction. The results are discussed in terms of the present theories of the ionization process and some suggestions are offered for future work on this problem. (Author)

AD-274 693 Div. 25
(TISTP/MFA) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
ON THE STRUCTURE OF STRONG PLASMA SHOCK WAVES IN A TRANSVERSE MAGNETIC FIELD,
by G. G. Comisar. 15 Feb 62, 24p. incl. illus. 15 refs. (Rept. no. TDR-930(2210-04)TR-2)
(Contract AF 04(647)930)
(DCAS TDR 62-12) Unclassified report

DESCRIPTORS: (*Plasma physics, *Shock waves, *Magnetic fields, Electrical conductance.) (Particles, Density of Electrons, Ions, Gas discharges.) (Hydrodynamics, Equations, Differential equations, Partial differential equations, Functional analysis.)

The structure of a plane stationary shock wave in a plasma with a transverse magnetic field is explored by using the restricted variational principle of Rosen to evaluate the adjustable factors of Mott-Smith's bimodal representation for the ion and electron distribution functions. The resulting solutions, in the strong shock limit, indicate that the particle number densities are essentially those of the nonmagnetic case, and that the transverse magnetic field departs considerably from the usual frozen-in field profile, due to the local dissipative effects of electrical conductivity. (Author)

AD-274 694 Div. 25, 27, 8
(TISTM/EJH) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
ENERGY CONVERSION PROGRAM. THERMIONIC CONVERTER STUDIES.
Semiannual technical rept., 1 July-31 Dec 61,
by G. L. Johnston. 14 Feb 62, 19p. incl. illus. 6 refs. (Rept. no. TDR-930(2220-50)TR-2)
(Contract AF 04(647)930)
(DCAS TDR 62-20) Unclassified report

DESCRIPTORS: (*Electric power production, Generators, *Electric propulsion, *Thermionic emission, *Plasma physics, Cesium electron tubes, Cathodes (Electron tubes), Design, Seals, Materials, Ceramic materials, Laboratory equipment, Spectrographic analysis, Electric insulation, High temperature research, Low pressure research.) (Cesium, Gas ionization, Vapors, Thermodynamics, Transport properties.)

Contents:
Plane-parallel thermionic converter
Plasma spectroscopy experiment
Glass enclosed converter
Model of plasma converter operation
Thermodynamic and transport properties of a cesium plasma
Interaction of cesium vapor and refractory metal surface

AD-274 695 Div. 25
(TISTP/MFA) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
AN INSTRUMENT TO MEASURE THE ELECTRICAL CONDUCTIVITY OF ARC PLASMA JETS,
by A. E. Fuhs. 1 Jan 62, 22p. incl. illus. tables, 5 refs. (Rept. no. TDR-930(2230-03)TN-4)
(Contract AF 04(647)930)
(DCAS TDR 62-29) Unclassified report

DESCRIPTORS: (*Transducers, Measurement, Electrical conductance, *Plasma jets, *Instrumentation.) (Gas flow, Velocity, Tests, Argon.) (Conductors, Calibration, Aluminum, Stainless steel, Graphite.)

A transducer has been developed which measures the product of electrical conductivity and velocity (s,u) of conducting gases flowing along its axis. The instrument was calibrated by moving aluminum or graphite rods through the transducer. By using thin-wall, stainless steel tubing, the influence function for the transducer was also obtained. Tests were run on two different arc plasma jet facilities. Values of s, u ranged from 0.02 to 9 megamhos per second. (Author)

AD-274 696 Div. 25, 13
(TISTP/WH) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
LAYERED CYLINDRICAL SHELLS,
by J. P. Jones, 5 Feb 62, 28p. incl. illus.
(Rept. no. TDR-930(2119)TN-3)
(Contract AF 04(647)930)
(DCAS TDR 62-34) Unclassified report

DESCRIPTORS: (Cylindrical bodies, *Structural shells, Vibration.) (Wave transmission, *Elasticity.) Deformation.

The equations of motion for a two-layered circular cylindrical shell are derived neglecting shear deformation and rotatory inertia. As examples, three cases are considered: the propagation of longitudinal waves, ring-type vibrations, and the case where the two Poisson's ratios are equal to 1/3. (Author)

AD-274 697 Div. 25, 20
(TISTP/JW) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
STRUCTURES OF MAGNETOHYDRODYNAMIC DETONATION WAVES,
by C. C. Chang and Y. C. Whang. 28 Feb 62, 17p. incl. illus. table, 14 refs. (Rept. no. TDR-930(2230-05)TN-2)
(Contract AF 04(647)930; In cooperation with Florida U.)
(DCAS TDR 62-37) Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, Detonation waves, Electricity, Conductivity, Gases.) (Magnetic fields, *Plasma physics.) (High temperature research, *Thermonuclear reactions, Reaction time, Shock.)

Magnetohydrodynamic (MHD) detonation waves of electrically conductive gases and their structures are treated theoretically with consideration to reaction energy release and transport properties. The energy release may be of thermonuclear origin for extremely high temperature plasma or of chemical process for reactive gases under the influence of a specified magnetic field. With a simplified model of energy release and electric conductivity, the structures of the detonation waves are numerically calculated as examples. The preliminary results indicate that the MHD detonation wave thickness is much larger than that of a MHD shock wave under the same upstream conditions. The coupling between the shock zone and the reaction zone is strong. (Author)

AD-274 699 Div. 25
(TISTP/MFA) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
EXPERIMENTAL MAGNETOHYDRODYNAMIC TURBULENCE INVESTIGATIONS.
Semiannual technical rept., 1 July-31 Dec 61,
by E. B. Turner. 28 Feb 62, 16p. incl. illus.
(Rept. no. TDR-930(2210-03)TR-1)
(Contract AF 04(647)930)
(DCAS TDR 62-45) Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, Magnetic pinch in *Discharge tubes, Plasma oscillations.) (Measurement of Turbulence in Magnetic fields by Oscilloscope probes.) (Instrumentation, Photographic analysis, Oscilloscopes, Photographs.)

An experimental program on magnetohydrodynamic turbulence is presented. The experimental apparatus, which is essentially a linear pinch device, is described. Experimental results which are discussed include electrical current waveforms, Kerr cell camera photographs, and magnetic field probe measurements. Kerr cell photographs clearly show the breakup of the plasma column due to instabilities; and a statistical study was begun of the sizes of the instabilities. A technique is described using an x-y oscilloscope to obtain an estimate of the correlation between two magnetic probe signals for various distances between the probes. From these data, we hope to obtain the energy spectrum and an estimate of isotropy of the turbulence. (Author)

AD-274 700 Div. 25
(TISTP/MFA) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
AC STABILIZED THETA PINCH.

Progress rept.,
by Stanley L. Leonard and Mitchell H. Dazey.
12 Feb 62, 12p. incl. illus. table, 3 refs.
(Rept. no. TDR-930(2210-02)TN-1)
(Contract AF 04(647)930)
(DCAS TDR 62-46) Unclassified report

DESCRIPTORS: (*Plasma physics, Plasma oscillations, *Magnetic pinch in Magnetic fields, Gas discharges.) (Instrumentation, Oscillators, Electron tubes, Discharge tubes, Photomultipliers.) (Measurement of Electrons, Density, Temperature.) (Spectrographic analysis in Continuous media.)

Attempts to produce dynamic stabilization of the plasma column in the Physical Research Laboratory's theta-pinch experiment by means of an rf azimuthal magnetic field are described. The rf currents used were produced by the damped oscillatory discharge of high-voltage capacitors through the inductance of the plasma column. The maximum rf current (at the end of the first half cycle) was 13,900 amperes at 2.5 megacycles. No evidence of stabilization was obtained. A pulsed 1-megawatt vacuum-tube oscillator, designed to produce an undamped rf current, is being constructed. Spectrographic investigation of the continuum intensity, the variation of the continuum intensity with wavelength, and the Stark broadening of the D/beta Balmer line have yielded values for the electron temperature and the electron (ion) density. (Author)

AD-274 701 Div. 25, 12
(TISTP/MFA) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
ADDITIONAL COMMENTS ON A TECHNIQUE FOR OBTAINING THE ELECTRICAL CONDUCTIVITY/VELOCITY PROFILE,
by A. E. Fuhs. 12 Mar 62, 30p. incl. illus. 5 refs. (Rept. no. TDR-930(2230-03)TN-5)
(Contract AF 04(647)930)
(DCAS TDR 62-52) Unclassified report

DESCRIPTORS: (*Electrical conductance, Velocity, Measurement by *Transducers.) (Plasma oscillations, Electromagnetic waves, Gas ionization, Propagation, Scattering, Boundary layer, Shock waves.) (*Re-entry vehicles, Satellite vehicle research.) (Tests and Analysis, Mathematical analysis.)

Measurement of the electrical conductivity/velocity profile of a plasma sheath appears possible by the use of transducers of suitable design. A transducer is characterized by a set of influence functions. Mathematical criteria are established to measure the degree of independence of these functions. Three transducers are described and the performance of each is analyzed. Results of the measurement of a known conductivity/velocity profile are discussed. (Author)

AD-274 703 Div. 25, 8
(TISTP/FR) OTS price $3.60

Aerospace Corp., El Segundo, Calif.
ELECTRONICS PROGRAM. SOLID STATE ELECTRONICS.
Semiannual technical rept., 1 July-31 Dec 61.
28 Feb 62, 26p. incl. illus. 10 refs. (Rept. no. TDR-930(2250-10)TR-1)
(Contract AF 04(647)930)
(DCAS TDR 62-68)
Unclassified report

DESCRIPTORS: (Infrared detectors, *Masers.) (Cryostats, *Superconductivity, Superconductors, Electromagnets.) *Thin films.

A study of the effects produced by intense laser beams on the detection characteristics of infrared detectors was made. The electronic properties of various materials in thin-film form are being studied. Such phenomena, for example, as quantum-mechanical tunneling through thin metallic-insulator sandwiches and single crystal behavior in epitaxially-grown semiconductor surfaces may provide the basis for multifunction circuits characterized by very small dimensions and a high degree of reliability. Experiments to investigate the energy gap of superconducting materials in the 0.3 to 1 degree K temperature range are discussed. The He3 refrigerator necessary for this research is described. In addition, experiments in which the effect of microwave phonons on the properties of superconductivity are discussed. The design of a high-field superconducting magnet utilizing commercially available materials is described.

AD-274 706 Div. 25, 30
(TISTM/EJH) OTS price $2.60

Aerospace Corp., El Segundo, Calif.
THE EMISSION SPECTRA BEHIND IONIZING SHOCK WAVES IN HYDROGEN,
by Richard M. Head. 20 Mar 62, 20p. incl. illus. table, 5 refs. (Rept. no. TDR-930(2210-05)TN-2)
(Contract AF 04(647)930)
(DCAS TDR 62-78) Unclassified report

DESCRIPTORS: (*Spectrographic analysis, Shock tubes, *Shock waves, *Gas ionization, Gas discharges, Plasma jets, *Hydrogen, Impurities.) (Electromagnetic waves, *Spectrographic data, Intensity, Wave analysis, Molecular spectroscopy, Gases.) (Laboratory equipment, Inspection windows, Quartz.)

The time-integrated emission spectra of a H plasma at a temperature of the order of 10 ev, obtained in an electromagnetic shock tube, and of impurities, primarily from the windows through which the spectrographic measurements were made, are presented. The majority of these lines will be observed in any shock tube used to generate highly ionized gases where observation windows are in contact with such a gas. (Author)

AD-274 712 Div. 25
(TISTE/NTM) OTS price $2.00

Physical Electronics Research Lab., Institute of Tech., U. of Minn., Minneapolis.
PHOTOEMISSION STUDIES.
Final rept., 16 June 59-15 Dec 61,
ed. by W. T. Peria. Mar 62, 50p. illus. 56 refs.
(Contract AF 33(616)6455, Proj. 8-(8-4156))
(ASD TDR 62-231) Unclassified report

DESCRIPTORS: (*Photoemission, Sodium, Germanium, Silicon, *Crystals, Work functions, Tests.) (Semiconductors, Space charges, Ionic current, Adsorption, *Photoelectrons, Electrons, Surface properties, Measurement.) (Thin films, Sodium compounds, Antimonides, Processing.)

Experimental results having to do with the influence of Na overlayers on the photoelectric emission and work function of Ge and Si crystals are presented. In the case of Ge, a model is presented which leads to a dependence of the photoelectric threshold on coverage which agrees with the experimental results. The model also allows one to calculate the threshold value at which ionic adsorption terminates, and an anomaly in the experimental curves is found at this same value. For silicon, the simultaneous measurement

of the photoelectric threshold and the work function is a valuable technique, allowing inferences to be made as to the source of the photoelectrons in the surface region, and the nature and degree of band-bending at the surface. Experimental methods leading to the successful preparation of bulk Na3Sb are described and a glovebox facility required for further exploitation of the technique is described. Progress on a newly-instituted phase of the project, viz., the study of Na3Sb films, is summarized and a new tube, in which control of the film composition may be achieved, is described. A calculation of the potential variation in the surface space-charge region of an intrinsic semiconductor is given. (Author)

AD-274 717 Div. 25, 17, 14
(TISTM/BRW) OTS price $2.60

Battelle Memorial Inst., Columbus, Ohio.
EFFECTS OF VARIOUS IMPURITIES ON LATTICE THERMAL CONDUCTIVITY IN BISMUTH TELLURIDE.
Final rept., 1 May 57-30 Apr 62,
by A. C. Beer and R. T. Bate. 30 Apr 62, 23p. illus. 24 refs.
(Contract Nonr-231600, Proj. NR-017-434)
Unclassified report

DESCRIPTORS: (Semiconductors, Intermetallic compounds, *Bismuth compounds, *Tellurides, Selenides, *Thermal conductivity, Lattices, Thermoelectricity, Chemical impurities, Temperature.) Bismuth alloys, Tellurium alloys, Selenium alloys.

An investigation was made of the effects of lattice imperfections, with particular emphasis on alloying, on the lattice thermal conductivity, K sub L, of thermoelectric materials such as Bi2Te3 or PbTe. It was found that these imperfections can cause a significant reduction in K sub L at room temperatures, and that in the vicinity of liquid nitrogen temperatures the effect can be quite pronounced. Another noticeable factor at temperatures below 200 K is the deviation in temperature dependence from a 1/T behavior, with K sub L becoming essentially temperature independent or exhibiting anomalous maxima in the vicinity of 80 K. Except for the cases involving the anomalies, it was possible to account for the effect of the alloying by taking into account the scattering of lattice waves by (1) elastic strain fields around the static imperfections, because of anharmonicity in the interatomic forces, (2) disturbances resulting from a foreign atom being bound to its neighbors by binding forces of different elastic properties from those of the normal interatomic forces in the host crystal, and (3) perturbations arising from the substitutional atom having a different mass. (Author)

AD-274 723 Div. 25
(TISTP/JW) OTS price $4.60

Chalmers U. of Tech. (Sweden).
THE INTERACTION BETWEEN AN OBLIQUELY INCIDENT PLANE ELECTROMAGNETIC WAVE AND AN ELECTRON BEAM IN THE PRESENCE OF A STATIC MAGNETIC FIELD OF ARBITRARY STRENGTH,
by K. H. B. Wilhelmsson. 1961, 31p. incl. illus. 6 refs. (Rept. no. US 25)
(Contract AF 61(052)451)
(AFCRL 62-124) Unclassified report

DESCRIPTORS: (*Electromagnetic waves, *Electron beams.) (Plasma oscillations, Resonance scattering, Cylindrical bodies, Surface properties.)

The interaction between an obliquely incident plane electromagnetic wave and an electron beam is studied. A static magnetic field of arbitrary strength is assumed present in the axial direction. Machine computations made for the case of a cylindrical electron plasma show that resonances occur in the backscattering cross section as a function of the angle of incidence of the plane wave. The dependence of the resonance angles on the plasma frequency for fixed gyro frequency suggests a possibility to utilize the results of the investigation for diagnostics of a cylindrical plasma. (Author)

AD-274 725 Div. 25, 20
(TISTP/JW) OTS price $3.60

Chalmers U. of Tech. (Sweden).
SCATTERING OF ELECTROMAGNETIC WAVES BY AN ANISOTROPIC MEDIUM,
by K. H. B. Wilhelmsson. 1961, 21p. incl. illus. 3 refs. (Rept. no. US 24)
(Contract AF 61(052)451)
(AFCRL 62-123) Unclassified report

DESCRIPTORS: (*Scattering, *Electromagnetic wave reflections, Surfaces, Cylindrical bodies.) (Electromagnetic waves, Boundary layer, Electrons, Physics.)

The scattering of an obliquely incident plane electromagnetic wave by an anisotropic medium is studied. A Brewster angle is defined for the anisotropic medium and interpreted from an electron physics point of view. The treatment covers the planar and cylindrical cases. (Author)

AD-274 726 Div. 25
(TISTP/TL) OTS price $3.60

Chalmers U. of Tech. (Sweden).
DYNAMIC NON-LINEAR WAVE PROPAGATION IN IONIZED MEDIA. I. THE ISOTROPIC MEDIUM,
by O. E. H. Rydbeck. 1961, 20p. illus. (Rept. no. US 26)
(Contract AF 61(052)451)
(AFCRL 62-125) Unclassified report

DESCRIPTORS: (*Dynamics, Nonlinear systems, Theory of *Electromagnetic waves, Propagation in Ionization (Ionized media).) (*Radio waves, Reflection.) (Electrons, Density.) (*Plasma physics, Resonance, Plasma oscillations, Differential equations, Space charges.)

The purpose of the present series of research notes is to study the basic, dynamic non-linearities of the lossless or almost lossless ionized medium and to investigate the possible dynamic (parametric) interactions between, for example, high intensity and low intensity radio waves in the medium. Such interactions may, under certain conditions, lead to amplification of the weak, primary wave. A medium with dynamic non-linearities may also exhibit a reflection coefficient larger than unity for one of the returned frequency components. (Author)

AD-274 728 Div. 25, 2, 8
(TISTP/TL) OTS price $6.60

Florence U. (Italy).
ATMOSPHERIC DISPERSION AND ABSORPTION OF MICROWAVES.

Final rept.,
by Nello Carrara, Adriano Gozzini and others.
Sep 61, 63p. illus.
(Contract AF 61(052)437)
(AFCRL 62-136) Unclassified report

DESCRIPTORS: (*Atmosphere, Scattering and Absorption of *Microwaves.) (Measurement of the *Refractive index of *Nitrogen and *Oxygen.) (Instrumentation, *Refractometers, Barometers.)

The results of the measurements carried out on nitrogen and oxygen are given. Sensitivity of the order of 10 to the -10th power was achieved with the refractometer, but its use at such sensitivities is very delicate and required many precautions. At reduced sensitivity, i.e. at smaller synchroscope sweep velocities, the use of the refractometer was quite simple and satisfactory. Accurate measurements can be performed at sensitivities of 5.10 to the -9th power or lower. At present, the main use at higher sensitivities will be to detect small sudden changes of the refractive index. (Author)

AD-274 740 Div. 25, 15
(TISTP/JW) OTS price $4.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
STATISTICAL MECHANICAL THEORY OF MAGNETIC RESONANCE.
Doctoral thesis,
by P. L. Kelley, 1 May 62, 41p. incl. tables, 15 refs. (Technical rept. no. 261)
(Contract AF 19(604)7400)
(AFESD TDR 62-79) Unclassified report

DESCRIPTORS: (*Quantum mechanics, Nuclear magnetic resonance, *Resonance.) (Spin, Density, Oscillation, *Magnetic fields, Differential equations.) Theses.

The quantum statistical theory of magnetic resonance considered is that of independent spins in the presence of external static and oscillating fields and a heat bath. An equation of motion is found for only that part of the density operator necessary to calculate properties of the spin system resulting in a linear inhomogeneous integrodifferential equation. The kernel of the integral term, expressed as a power series in the pin-bath interaction, is cut off to a certain order by a Born-like approximation. The memory approximation is also made. Averaging the resulting equation over the bath gives a differential equation for the spin density operator. Conditions for the validity of the series cutoff and the memory approximation have been found. The first is tested by comparing one order in the series with the next higher-order term and the second approximation is tested by solving the integrodifferential equation by the transform method. Bloch's equation is found to agree with the present equation cut off to second order and memory approximated, except for inhomogeneous terms which arise in the present theory from initial conditions. For the case in which the density operator is linearized in the external oscillating field, terms are obtained which represent interference between the external oscillating field and the spin-bath interaction and which were neglected by Wangsness and Bloch. The linearized steady-state solution containing these additional terms has been found for spin 1/2. (Author)

AD-274 743 Div. 25, 13
(TISTP/WH) OTS price $5.00

Minnesota U., Minneapolis.
VIBRATIONS OF ELASTIC SYSTEMS TAKING ACCOUNT OF ENERGY DISSIPATION IN THE MATERIAL.
Rept. for Jan 60-July 61 on Metallic Materials,
by G. S. Pisarenko and ed. by A. R. Robinson.
Feb 62, 295p. incl. illus tables, 17 refs.
(Contract AF 33(616)6828, Proj. 7351)
(WADD TR 60-582)
Unclassified report

DESCRIPTORS: (Mechanical engineering, *Rotating structures, Rods, *Vibration, *Elasticity, Nonlinear systems.) (Energy, Damping, Rods.) USSR.

An analytical and experimental investigation is presented of vibrations of non-conservative elastic systems in which the sources of energy dissipation is irreversible cyclic straining of the material. Modern methods of analysis of nonlinear vibrating systems are extended to treat problems of the flexural vibrations of long bars of constant and variable cross section, short bars and turbine blades. Torsional vibrations of rods are also considered. Considerable attention is given to the experimental investigation of energy dissipation in the material. Several apparatuses are described and some of the experimental results presented. (Author)

AD-274 749 Div. 25, 15
(TISTP/JW) OTS price $4.60

Polytechnic Inst. of Brooklyn, N. Y.
ON THE ACCURACY OF APPROXIMATE THRUST STEERING SCHEDULES IN OPTIMAL CORRECTIONAL MANEUVERS,
by Samuel E. Moskowitz. Feb 62, 35p. incl. illus. tables, 6 refs. (PIBAL rept. no. 741)
(Contract AF 49(638)445, Proj. 9781)
(AFOSR-2284) Unclassified report

DESCRIPTORS: (*Thrust, Control systems, Guidance, *Orbital flight paths, Guided missile trajectories, Analysis of variance.) (Complex variables, Errors, *Corrections.)

A frequent variational problem is one for which the fuel expenditure is to be minimized. In practice, approximate thrust steering schedules that vary bilinearly or linearly with time are introduced to reduce the multidimensional trials involved in attaining a numerical solution. The degree of approximation is established which is induced when these approximate programs are used for the correctional maneuver characterized by a small parameter which is related to the percentage change in orbital characteristics. For the maneuver the thrust magnitude is assumed to be constant and can be of the same order as the central force. It is proved that if there is an acceptable error in the minimum value of the burning time, then the bilinear program is applicable regardless of imposed end constraints. However, for a special class of correctional maneuvers, defined by the property that boundary conditions are weakly dependent upon the circumferential displacement, one can utilize the simpler linear program with the same degree of accuracy. Numerical verification of this theory is given by considering examples and comparing the results of burning time and terminal values of the dependent variables with exact solutions. (Author)

AD-274 753 Div. 25
(TISTM/BRW) OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
ELASTIC STABILITY OF BARS OF ARBITRARY LENGTH,

by Frederick F. Ling and George H. Handelman.
22 Mar 62, 20p. incl. illus. table, 10 refs.
(RPI MathRep. no. 53)
(Contract AF 49(638)962)
(AFOSR-2264) Unclassified report

DESCRIPTORS: (*Rods, *Elasticity, *Stability, Mechanical properties, Stresses, Deformation, Theory, Beams, Mathematical analysis.) Mechanics, Applied mechanics.

The linearized, elastic stability theory of Biezeno and Hencky (Koninklijke Akademie van Wetenschappen te Amsterdam, Proceedings, 31:569 to 592, 1928) for problems which are nonlinear both physically and geometrically are applied to two cases. An exact, plane strain solution, in closed form, is obtained for rectangular bars under uni-axial initial stress. Also obtained is an exact solution for round bars under uni-axial initial stress. Results show that the theory yields plausible information for bars of arbitrary length, i.e. included are short bars whose stability behavior have eluded description by classical theories. (Author)

AD-274 758 Div. 25
(TISTP/JW) OTS price $11.00

Stanford Research Inst., Menlo Park, Calif.
INTERACTION OF ELECTROMAGNETIC WAVES WITH A PLASMA.
Final rept.,
by Carson Flammer, S. V. Yadavalli and others.
Apr 62, 141p. incl. illus. refs.
(Contract AF 19(604)7396, Proj. 5561)
(AFCRL 62-185) Unclassified report

DESCRIPTORS: (*Plasma physics, Mechanical properties, *Non-linear differential equations, Magnetic fields, Electromagnetic effects, Solar energy.) (*Entropy, Particles, Distribution theory.) *Plasma oscillations.

From statistical mechanical aspects of plasmas through relativistic and nonlinear treatments of plasmas, a study is presented of the plasma in the interface between the earth's magnetic field and the solar wind, and the coupling of electromagnetic energy into an inhomogeneous plasma. It is shown how appropriate initial distribution functions for a plasma are obtained from given initial macroscopic quantities by means of the maximum entropy principle. A new approach to the solution of the Liouville equation is also presented. Phenomenological considerations are used to obtain a one-particle distribution function that consists of two parts that account for the effects of the distant particles and the nearest neighbors. From this distribution function and Liouville's theorem, a general kinetic equation for a particle in a plasma and its dynamical friction are demonstrated. (Author)

AD-274 765 Div. 25, 15
(TISTP/JW) OTS price $8.10

Mathematics Research Center, U. of Wisconsin, Madison.
ON THE EXTERIOR BOUNDARY VALUE PROBLEM OF PERFECT REFLECTION FOR STATIONARY ELECTROMAGNETIC WAVE FIELDS,
by Peter Werner. Feb 62, 79p. 17 refs.
(MRC Technical summary rept. no. 286)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: (Partial differential equations, *Electromagnetic waves, Electromagnetic fields, *Integral equations, *Boundary layer.)

The boundary value problem is reduced to a system of Fredholm integral equations which is solvable for all positive frequencies. The numerical computation of the solutions which previously contained considerable difficulties when the electrical conductivity was zero or small, can now be placed on a rigorous foundation. Important dependence properties can be derived which could not be established within the previous framework. As a consequence, the radiation conditions which were previously employed to characterize the physically relevant solutions can be replaced by the principle of limiting absorption which seems to be much more satisfactory from a physical point of view. The behaviour of the stationary electromagnetic field is discussed. Final results in this direction are only obtained under the additional assumption that all reflecting bodies are simply connected. It is proven that the electric field E tends analytically to a corresponding electrostatic field. This leads to a mathematical foundation of some assumptions often used in the theory of low frequency approximations. (Author)

AD-274 780 Div. 25
(TISTP/JW) OTS price $3.60

Rensselaer Polytechnic Inst., Troy, N. Y.
CRYPTO-STEADY PRESSURE EXCHANGE,
by J. V. Foa. Mar 62, 33p. incl. illus. 4 refs.
(Rept. no. TR AE 6202)
Unclassified report

DESCRIPTORS: (Mechanical properties, *Energy, Transformers.) (*Pressure exchangers, Turbines, Thrust, Lift, *Fluid flow.)

Crypto-steady pressure exchange is a mode of direct energy transfer between flows, based on the principle that two adjacent streams which are both isoenergetic in the same frame of reference will, in general, exchange mechanical energy in any other frame. The efficiency of this process is potentially high, because a change of frame of reference is reversible, and the associated transfer of energy is therefore nondissipative. An application of this principle to thrust or lift generation is discussed for the purpose of illustration. In this application the interacting flows are steady and isoenergetic in a rotating frame of reference but exchange energy in a stationary frame. The exchange mechanism is essentially similar to that of a turbofan, but the blades are now patterns rather than bodies of abiding materials. Performance calculations are carried out for the case of interactions taking place within short ducts of constant cross-sectional area. (Author)

AD-274 792 Div. 25
(TISTP/JW) OTS price $4.60

Rosemount Aeronautical Labs., U. of Minn., Minneapolis.
AERODYNAMIC AND HEAT TRANSFER CHARACTERISTICS OF BASIC BODIES IN HYPERSONIC FLOW OF AIR AND OF COMBUSTION GAS MIXTURES,
by R. Hermann, K. O. Thompson, and W. L. Melnik.
Apr 62, 136p. incl. illus. tables, refs. (Rept. no. RAL RR 179)
(Contract AF 40(600)886, Proj. 8952)
(AEDC TDR 62-89) Unclassified report

DESCRIPTORS: (Blunt bodies, *Airfoils, Conical bodies, Heat transfer, Hypersonics.) (*Gas flow, *Combustion chamber gases, Pressure, Water vapor, Condensation.)

Experimental results of pressure distribution on a blunted cone, a skirted hemisphere-cylinder model, and a blunt leading edge diamond airfoil, and corresponding heat transfer distributions of the latter two bodies are presented. Nominal test conditions were Mach Number equals 6.6 at stagnation temperature 2500 R and unit Reynolds Number equals 2.8 x 10 to the 5th power per foot. To compare pressure ratios in the different media, the effects of water vapor condensation on free stream conditions must be accounted for. Maximum unexplained model pressure coefficient differences between media were as high as 25% along the skirt of the hemisphere-cylinder model, 10% on the blunt cone, 9% on wedge at alpha = 15 degrees. Tests in all media showed a strong leading edge effect. Results show that in the test section the pitot pressure is little affected, but static pressure and Mach number are strongly affected by water vapor condensation. The stagnation point heat transfer rate measured in an airstream is nearly 6% higher than the Fay-Riddell theory; stagnation point data obtained in flow of simulated combustion products is nearly 22% lower than theory. Experimental results are given for angles of attack from 0 to 15 degrees; the data are compared with results from the Bertram-Feller theory and the reference enthalpy method. (Author)

AD-274 794 Div. 25, 30
(TISTM/GEC) OTS price $2.50

Barnes Engineering Co., Stamford, Conn.
STUDY OF A TEMPERATURE MEASURING SYSTEM FOR THE 1000 C TO 2500 C RANGE.
Rept. for 1 July 60-31 Aug 61,
by Guy Moffitt. Feb 62, 90p. incl. illus. tables, 72 refs.
(Contract AF 33(616)7479, Proj. 8224)
(ASD TR 61-487) Unclassified report

DESCRIPTORS: (Design of *Radiometers for sensing Ultraviolet radiation and Blackbody radiation for Measurement of *Surface temperatures of Solids, Feasibility studies, High temperature research.) (Tests, Molybdenum, Controlled atmospheres, Oxidation, Nuclear energy, Radiation effects.)

A radiometer, operating in the UV region was designed and built to automatically measure the surface temperature of a very hot solid surface. The device senses the UV radiation in the 0.32 to 0.38 micron band, self emitted from a small area on the hot solid surface. The temperature measurement accuracy was investigated for large effective fluctuations of emissivity over a temperature range from 1000 to 2500 C, using a W strip lamp for calibration reference. Feasibility models were constructed and operated in room temperature environments. Temperature data was obtained for varying emissivity of Mo in oxidizing conditions. Preliminary considerations were investigated for application of the radiometer in high temperature oxidizing and nuclear radiation environments in airborne vehicle systems. (Author)

AD-274 796 Div. 25, 15
(TISTP/MFA) OTS price $4.60

Brown U., Providence, R. I.
THE NON-SYMMETRICAL SNAP BUCKLING OF THE CLAMPED SPHERICAL CAP,
by A. Gjelsvik and S. R. Bodner. Mar 62, 32p. illus. 11 refs. (Technical rept. no. 30)
(Contract Nonr-56220, Proj. NR-064-424)
Unclassified report

DESCRIPTORS: (Buckling, Deformation, *Stresses, Hydrostatic pressure, Load distribution, Metal plates, *Clamps, Energy.) (Matrix algebra, Integral equations, Differential equations, Transformations (Mathematics).)

The non-symmetrical snap buckling of uniformly loaded clamped spherical caps is computed by an energy procedure. Non-symmetrical buckling is shown to govern when the geometrical parameter that represents the steepness of the cap exceeds a particular value. Single term approximations are used to represent the initial and buckled shapes which, although showing the general features of the problem, do not lead to fully reliable numerical values. A more accurate analysis that includes the development of a boundary layer in the cap is used to compute the equal energy buckling load. The significance of the energy load as a lower bound on buckling loads is discussed. (Author)

AD-274 806 Div. 25, 15
(TISTP/TL) OTS price $4.60

Illinois U., Urbana.
A DYNAMICAL APPROACH TO THE SELECTION RULE $|\Delta I| = 1/2$,
by E. R. McCliment and K. Nishijima. 1962, 48p. illus. tables, 33 refs.
Unclassified report

DESCRIPTORS: (*Quantum statistics, *Kinetic theory, Equations of Motion, *Electromagnetic waves, Scattering, *Particles, Hyperons, Pions, Nucleons, Nuclear spins.) (Integral equations, Matrix algebra, Perturbation theory, Integral transforms, Operators (Mathematics), Green's function, Series, Functions.)

Identifiers: Isospin.

By giving up the unrenormalizable Lagrangian theory, the problem of weak interactions was studied by means of the unsubtracted dispersion relations. In this formalism the selection rule Delta Isospin equals 1/2 in the non-leptonic decays of strange particles is shown to be a consequence of the charge independence of strong interactions. The unsubtracted dispersion relations further serve to determine the coupling constants in strong interactions as eigenvalues. Reasonable agreement with experiment was found for the non-leptonic hyperon decays for the even Sigma Lambda parity. (Author)

AD-274 814 Div. 25, 4
(TISTM/EJH) OTS price $7.60

Acoustics Research Lab., Harvard U., Cambridge, Mass.
EFFECTS OF PRESSURE AND DIELECTRIC CONSTANT ON SOUND ABSORPTION IN MAGNESIUM SULFATE SOLUTIONS,
by Frederick H. Fisher. Mar 62, 36p. incl. illus. tables, 28 refs. (Technical memo. no. 46)
(Contract Nonr-186624, Proj. NR 384-903)
Unclassified report

DESCRIPTORS: (Liquids, *Solutions, Magnesium compounds, Sulfates, Water, Ethylenes, Dioxides, *Sound, *Absorption, *Acoustic insulation, Pressure, Dielectrics, Chemical reactions, Relaxation time.) Test equipment.

The simple dissociation model proposed by Bies (J. Chem. Phys. 23:428, 1955) to explain acoustic absorption in $MgSO_4$ solutions does not give a complete quantitative description of experimental results in aqueous and dioxane-water solvents at atmospheric pressure. An attempt was made to explore the reasons for the failure of Bies'

theory by measuring acoustic absorption as a function of pressure in MgSO4 solutions with two values for the dielectric constant. At the high concentration used, 0.5 M, a change in the dielectric constant from D = 78.5 (water) to D = 56.5 (25% dioxane-water) was accompanied by negligible changes in the magnitude and pressure dependence of the absorption. This behavior, together with that observed by Bies at low concentrations and atmospheric pressure, is consistent with the existence of an intermediate reaction, before dissociation, which is responsible for acoustic absorption. Velocity as a function of pressure, and the relaxation frequency at atmospheric pressure, are given for the 25% dioxane-water solution. (Author)

AD-274 829 Div. 25
(TISTP/TL) OTS price $2.60

Norwegian Defence Research Establishment.
TRANSVERSE ELECTRON BEAM NOISE DESCRIBED BY FILAMENTARY BEAM PARAMETERS,
by Kjell Blotekjaer. 20 Nov 61, 22p. incl. illus. 13 refs. (Technical note no. 2)
(Contract AF 61(052)531)
(RADC TDR 62-217) Unclassified report

DESCRIPTORS: (Analysis of interaction between *Electron beams and transverse Electromagnetic fields and the Velocity of *Noise, Excitation.) (Emission of Electrons from Cathodes.)

The analysis is concerned with the transverse velocity and position noise on electron beams. The equivalence between the actual, noisy beam and a modulated filamentary beam is pointed out, and the frequency components of the equivalent filamentary beam modulation is calculated. It is shown that the transverse position noise is reduced by a factor, gamma sq., which is identical to the space-charge reduction factor for the longitudinal shot noise. The noise excitation is also expressed in terms of self power and cross power densities of the four normal modes on a rectilinear, filamentary beam in a longitudinal magnetic field. (Author)

AD-274 831 Div. 25, 14, 4
(TISTM/BRW) OTS price $3.60

Ohio State U. Research Foundation, Columbus.
THERMOELECTRIC MATERIALS.
Final rept., 1 Jan 60-30 Sep 61,
by T. S. Shevlin, H. E. Wenden, and S. R. Ali Zaidi. Sep 61, 32p. incl. illus. tables.
(Contract NObs-78254)
Unclassified report

DESCRIPTORS: (*Thermoelectricity, Materials, Sodium compounds, Vanadium compounds, Oxides, Electric potential, Measurement, Controlled atmospheres, Oxygen, Air, Helium, Hydrogen, Electron transitions, Fluids.)

Difficulty was experienced in containing molten Na2O.V2O4.5V2O5, a highly corrosive fluid. The precision and reproducibility of all results were very low. Na2O.V2O4.5V2O5 is a thermoelectric material in the liquid state yielding a potential difference of 2500 microvolts/C referred to as Pt when O is circulated over the hot junction and the cold junction is sealed. When air is circulated over the hot junction and the cold junction is sealed, a maximum potential difference of 700 microvolts/C may be attained. As the difference in temperature between hot and cold junctions is decreased, the potential difference increases, rising to a maximum near a temperature difference of 40 C. A reducing atmosphere over the hot junction reduces the thermal emf, and, if sufficiently reducing, reverses the polarity; an oxidizing atmosphere raises the emf, as compared with a neutral (He) atmosphere.

AD-274 834 Div. 25
(TISTP/TL) OTS price $3.60

Polytechnic Inst. of Brooklyn, N. Y.
EXPERIMENTAL HEAT TRANSFER AND TEMPERATURE DISTRIBUTION IN A HOLLOW TUBE WITH INTERNAL AIRFLOW AT HIGH TEMPERATURE AND PRESSURE,
by S. V. Nardo and Lawrence D. Brown. Mar 62, 18p. illus. tables, 6 refs. (PIBAL rept. no. 650)
(Contract Nonr-83923, Proj. NR 064-433)
Unclassified report

DESCRIPTORS: (*Heat transfer, Tests on Stainless steel, *Steel tubing at Subsonic flow of Air at High pressure research and High temperature research at Reynolds number.)

Results are presented of heat transfer tests conducted on a thick-walled, stainless steel tube subjected to an internal subsonic flow of air at pressures up to 465 psia and temperatures up to 1850 R. A total of six test runs were conducted at Reynolds Numbers (based on the diameter) which ranged from 4 x 10 to the 5th to 2 x 10 to the 6th power. The heat transfer data were in excellent agreement with a semi-empirical relation. The transient temperature distribution through the tube thickness was calculated for two cases from the transient, one-dimensional, cylindrical heat conduction equation using the theoretically determined heat transfer coefficients. A comparison of the temperature distribution obtained in this manner with experimentally measured temperatures under the same stagnation conditions showed fair agreement. (Author)

AD-274 843 Div. 25
(TISTB/LH) OTS price $12.00

Space Technology Labs., Inc., Redondo Beach, Calif.
MASERS AND LASERS: A BIBLIOGRAPHY,
by J. F. Price and A. K. Dunlap. Apr 62, 161p. 1294 refs. (Research Bibliography no. 41; Rept. no. 9990-6052-KU-000)
Unclassified report

DESCRIPTORS: *Bibliography, *Masers, *Lasers, Light, Amplifiers, Microwave amplifiers.

AD-274 849 Div. 25, 15
(TISTP/TL) OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE ELASTODYNAMICS OF MOVING LOADS. PART I,
by M. Papadopoulos. 1962, 18p. incl. illus. 12 refs. (MRC technical summary rept. no. 283)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: (Free Surfaces of *Elasticity, *Solids at Supersonics, Velocity, Vibration, *Stresses, *Shear stresses, Loading, Load distribution.) (*Partial differential equations, Time.)

The interaction process at the free surface is examined in detail in this analysis. The results of this fundamental problem may be extended by the process of superposition to more general steadily moving loads. In particular by differentiating with respect to time, the potential of a steadily moving point load is obtained explicitly. (Author)

Division 26 - PRODUCTION AND MANAGEMENT
Division 27 - PROPULSION SYSTEMS

26. PRODUCTION AND MANAGEMENT

AD-274 592 Div. 26, 17
(TISTM/BRW) OTS price $7.60

Republic Aviation Corp., Farmingdale, N. Y.
CAPACITOR DISCHARGE METAL FORMING.
Interim technical progress rept. no. 5, 3 Jan-3 Apr 62,
by A. Caggiano, J. Christiana and others. Apr 62, 69p. incl. illus. tables.
(Contract AF 33(600)42920, Proj. 7-844)
(ASD TR 7-844, vol. 5) Unclassified report

DESCRIPTORS: (Metals, Deformation, *Explosive forming, Underwater explosions, *Electric discharges, *Capacitors, Shock waves, Electrical equipment, Circuits, Energy, Analysis, Electric currents, Electric potential.) Sheets, Processing.

The energy transfer phenomena in electrohydraulic metal forming are described. The variable parameters of energy level, inductance, initiation wire material, diameter and length, gap distance, standoff distance, and liquid medium are evaluated relative to current, pressure, and deformation work. (Author)

AD-274 651 Div. 26, 14, 17, 12
(TISTM/EJH) OTS price $8.10

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A GENERAL STUDY OF PROCESSES FOR THE REALIZATION OF DESIGN CONFIGURATIONS IN MATERIALS.
Interim technical progress no. 2, 3 Oct 61-3 Apr 62 on Proj. NEOS,
by Paul Rosenthal. Apr 62, 86p. incl. illus. tables, 26 refs. (Rept. no. NM-1559-P-2)
(Contract AF 33(600)42921)
(ASD IR-2) Unclassified report

DESCRIPTORS: (*Materials for Spaceships, Aircraft, *Manufacturing methods, Processing, *Transformations, Phase transitions, Feasibility studies.) (Abrasion, Bonding (Solid state), Chemical milling, Drawing (Machine processing), Sintering, Ultrasonics, Melting, Welding, Radiation effects, Machining.) (Solids, Refractory materials, Ceramic materials, Crystals.) (Temperature, Pressure, Electric fields, Magnetic fields.)

Following the development in previous studies of a generalized concept of the manufacturing process, and its classification according to form of energy, mode of energy transfer, environment, and process topology, results of parallel studies within the framework of these process elements are reported. These studies have been of two kinds: (1) broad studies of entire categories, such as material addition by solid state bonding and (2) feasibility studies of promising effects, such as increasing the ductility of certain brittle materials under the influence of electric fields. A table of criteria for the evaluation of processes has been developed and six established and candidate processes have been entered. (Author)

AD-274 832 Div. 26, 25, 14
(TISTM/EJH) OTS price $5.60

Pennsalt Chemicals Corp., Philadelphia, Pa.
REVIEW OF CRYSTAL GROWTH METHODS,
by F. D. Loomis, C. W. Graver, and I. Mockrin. Feb 62, 52p. incl. illus. tables, 83 refs.
(Technical rept. no. 1)
(Contract Nonr-314200, Proj. NR 356-423)
Unclassified report

DESCRIPTORS: (*Single crystals, *Crystals, Mica, Thin films, Growth, *Crystallization, Zone melting, Manufacturing methods, Crystal ovens, Laboratory equipment, *Bibliography.) (Production, Sheets, Solids, Solutions, *Potassium compounds, Aluminum compounds, *Rubidium compounds, Boron compounds, *Fluorides, *Aluminates.)

Crystal growth of fluoaluminates will be investigated as a step towards development of the commercial sheet form. The binary solid solution system, KAlF4-RbAlF4, and the ternary solid solution system, KAlF4-RbAlF4-KBF4, will be used. A review, which is not complete, was made of the large body of literature on crystal growth to enable selection of a suitable method. Also, the synthetic mica program was studied because of the similarity of its problems with those of fluoaluminates. Bibliographies of recent general reviews on crystal growth were the basis for starting the literature survey. Because of these reviews and several good reference works on crystal growth, no attempt was made to search the literature prior to 1958. In addition, Chemical Abstracts for 1958 and 1959, Nuclear Science Abstracts (1959) and Chemical Titles for 1960-1961 were searched. (Author)

27. PROPULSION SYSTEMS

AD-274 482 Div. 27, 12
(TISTA/SEB) OTS price $1.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
PROPELLANT ORIENTATION, VENTING, AND TEMPERATURE CONTROL UNDER ZERO-GRAVITY CONDITIONS,
by H. M. Satterlee. 1962, 18p. incl. illus. 6 refs. (Preprint 5-76-62-4)
Unclassified report

Spacecraft Thermodynamics Symposium, LMSC Research Labs., Palo Alto, Calif., 28 Mar 1962.

DESCRIPTORS: (*Satellite vehicles, *Booster rockets, Fuel systems, *Liquid rocket propellants.) (*Propellant tanks, Temperature control, Ventilation, Space environmental conditions, Weightlessness, Acceleration.) (Rocket fuels, Rocket oxidizers, Surface properties, Surface tension.) Gas pressurization systems.

The location of residual propellants in Agena tanks is important to the performance of several parts of the Agena system including ullage orientation devices, propellant venting systems, and methods of propellant temperature control. The equilibrium location of propellants in a space vehicle tank depends on the level of acceleration acting on the vehicle. Current and past methods of venting residual propellants are discussed. The method for controlling the temperature of propellants retained onboard the Agena is described. The status of a current study to determine propellant temperatures and circulation under orbital conditions is reported. (Author)

AD-274 522 Div. 27, 17, 14
(TISTM/BRW) OTS price $3.60

Little, Arthur D., Inc., Cambridge, Mass.
DEVELOPMENT OF PYROLYTIC REFRACTORY MATERIALS FOR SOLID-FUEL ROCKET MOTOR APPLICATIONS.
Quarterly status rept. no. 2,
by Ronald Francis. 10 Jan 62, 34p. incl. illus. tables, 6 refs. (Rept. no. C-63938)
(Contract DA 19-020-ORD-5490, Proj. 5B93-32-004)
(WAL TR 766.41/2-1) Unclassified report

DESCRIPTORS: (Materials, Alloys for Solid rocket propellants, *Rocket motors, Preparation, Tests.) (*Refractory materials, Refractory coatings, Graphite, Metallic compounds, Halides, Hydrocarbons, Pyrolysis, Deposits, Vapor plating.) (Boron alloys, Molybdenum alloys, Tungsten alloys, Zirconium alloys, Silicon alloys, Titanium alloys, Chromium alloys, Manganese alloys, Density, Microstructure, Crystal structure.) (*Rocket motor nozzles, Manufacturing methods, Physical properties, Thermal insulation, Oxidation.)

Continued investigations of the preparation and evaluation of refractory metal alloys of pyrolytic graphite as a function of synthetic parameters are presented. Induction furnace modifications for vapor plating to temperatures in excess of 2500 C, development of analytical techniques, development of coating procedures on complex shapes and additional oxidation data of the materials are reported. Methods of producing satisfactory coatings of various pyrolytic graphites and alloys on graphite nozzles for test firings with Arcocel 163 (6500 F, aluminized) propellant are also described. (Author)

AD-274 648 Div. 27, 10
(TISTA/SEB) OTS price $3.60

Battelle Memorial Inst., Columbus, Ohio.
HEAT TRANSFER TO A SOLID-PROPELLANT ROCKET-MOTOR NOZZLE.
Topical rept., Sep 60-June 61,
by E. W. Ungar. 30 Dec 61, 29p. incl. illus. tables, 9 refs.
(Contract AF 33(616)6358, Proj. 7350)
Unclassified report

DESCRIPTORS: (Rocket motors, Solid rocket propellants, Exhaust gases, *Heat transfer to *Rocket motor nozzles, Tests.) (Particles, Drops, Deposits of Aluminum compounds, Oxides.) Temperature, Thermal insulation, Theory, Mathematical analysis, Equations.

The heat transfer to a small-scale rocket nozzle was studied under the conditions imposed by the combustion of two high-energy solid propellants. The exhaust contains large quantities of aluminum oxide. The heat-transfer problem can be separated into the heat transfer from the hot combustion products to a layer of deposited alumina and the heat transfer from the alumina layer to the underlying solid material. Temperature histories at several locations in Mb nozzles were measured with high-temperature thermocouples The heat-transfer rate was computed from the deposited alumina to the nozzles. During some periods of the motor firings, the heat transfer across the alumina layer could be deduced from steady-state relations. The temperature at the exposed alumina surface and the heat-transfer coefficient between the combustion products and the alumina was determined and agreed with turbulent heat-transfer theory. Although the alumina-deposit layer insulates the nozzle structure (and in so doing strongly influences the temperature history), transfer is negligible. Nozzle surface-temperature history was computed for various ceramic nozzle materials. Calculations successfully predicted the time in the firing at which melting or thermal degradation occurred. (Author)

AD-274 828 Div. 27, 26, 17
(TISTM/BRW) OTS price $2.60

Lyon, Inc., Detroit, Mich.
DEVELOPMENT OF DEEP DRAWN - ONE PIECE HIGH PERFORMANCE ROCKET MOTOR CASE.
General rept. no. 16, 10 Jan-10 Feb 62,
by Wayne A. Martin. 10 Feb 62, 26p. incl. illus.
(Contract DA 20-018-ORD-23004)
Unclassified report

DESCRIPTORS: (*Rocket cases, Manufacturing methods, Drawing (Machine processing), Heat treatment, Machine tools, Metal forming presses, Dies.) (Alloys, Metals, *Steel (300-M), *Titanium alloys, Nickel alloys, Cobalt alloys, Molybdenum alloys.)

Progress is reported on the fabrication of special tooling. The hot cup, first draw, second draw, third draw, and fourth draw die assemblies are complete. The fifth draw, sixth draw, and heading dies are nearing completion. Three cases were processed through three cold drawing operations each of which was followed by anneal at 1250 F for 1 hr. A chamber (AT-1) was sectioned for metallurgical analysis after completion of the hot cup operation and subsequent heat treatment. The total range in hardness over the entire section was from 98 to 99 Rockwell B. The grain flow pattern was radial in the dome and parallel to the longitudinal axis in the sidewall of the cup. The structure possessed a relatively fine ferritic grain (ASTM 7 to 8) and was completely spheroidized. Partial decarburization after normalizing treatment was indicated by an average carbon content of 0.34% in the outer 0.005 in. of material as compared to 0.43% carbon in the 0.005- to 0.010-in. layer. The microstructure and grain flow in all sections are in the optimum condition for subsequent cold work.

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-274 786 Div. 28
(TISTB/AW) OTS price $2.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
TIME AND ERROR IN HUMAN RECOGNITION OF ARABIC AND BINARY-CODED DECIMALS,
by D. L. Huebner. Jan 62, 23p. incl. illus. tables (ASRDL Technical rept. no. 2250)
Unclassified report

DESCRIPTORS: (*Identification systems, Man or Machines, Feasibility studies, Errors, Time.)

The feasibility of using direct human readout of binary-coded decimals in lieu of using a binary-to-decimal conversion device plus human readout was investigated. During three experiments, fourteen subjects were given a one-hour period of training in binary-coded-decimal readout. Statistical significance could not be established because of the small number of subjects in the sample. The following results were obtained: (a) The mean verbal response readout rate was

48 characters in 35 seconds for binary symbols as compared with 16 seconds for the same number of Arabic symbols; (b) The mean written rate was 48 characters in 39 seconds when reading binary symbols, and 34 seconds for Arabic readout; and (c) The error rate averaged 4.7 per thousand characters for binary written readout, and 2.0 per thousand for Arabic readout. Considering the fact of only one hour of training, the 15-percent loss of speed would not alone appear to be a sufficient disadvantage to justify providing a machine for converting binary to Arabic symbols. An experimental binary-coded-decimal notation system suitable for hand rendition and for human and machine readout is presented. (Author)

AD-274 800 Div. 28
(TISTB/MS) OTS price $3.50

Armed Services Technical Information Agency, Arlington, Va.
HUMAN ENGINEERING. AN ASTIA REPORT BIBLIOGRAPHY, comp. by Maurice B. Silverman. 15 May 62, 240p. 1200 refs.
Unclassified report

DESCRIPTORS: (*Human engineering, *Bibliography.)

This bibliography was prepared by ASTIA to make information on human engineering more readily available in document form. Citations are included for documents cataloged by ASTIA from 1952 to the present, and which are restricted to unclassified, unlimited references. The classified section of the bibliography appears separately as a secret document, identified as AD-329 000. References are arranged alphabetically by subject area pertaining to aircraft, communication systems, control system, display systems, data processing systems, equipment, literature, ordnance, rocket systems and guided missiles, human factors, satellites and spaceships, ships and submarines, training devices, and vehicles.

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

No Entries

30. RESEARCH AND RESEARCH EQUIPMENT

AD-274 506 Div. 30, 26
(TISTP/JW) OTS price $5.60

National Aeronautics and Space Administration, Washington, D. C.
PERT. PROGRAM EVALUATION AND REVIEW TECHNIQUE HANDBOOK.
1 Sep 61, 54p. incl. illus.
Unclassified report

DESCRIPTORS: (*Research program administration, Handbooks, *Operations research, Monitors.) (Computers, *Data processing systems.)

The NASA system for project planning, evaluation, and control is prescribed in handbook form. The NASA PERT System is a management tool basically designed to serve the project manager in the field, at the same time providing the selected information flow necessary for project monitoring and coordination within NASA, and project coordination among participating organizations. A derivation of the Navy Department's PERT System, it provides guides to determine the critical paths and thus focus management attention on current and potential problem areas. (Author)

AD-274 538 Div. 30, 15
(TISTP/FR) OTS price $2.60

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
A COMPARISON OF FORTRAN AND SYMBOLIC PROGRAMMING ON THE IBM 1620 COMPUTER.
Rept. on Mathematical Techniques of Aeromechanics, by Mary D. Lum and James C. Caslin. Nov 61, 21p. incl. tables, 3 refs. (Rept. no. ARL-179) (Proj. 7071)
Unclassified report

DESCRIPTORS: (Differential equations, Integration, *Digital computers, *Programming.)

A comparison is made of the relative merits of SPS (Symbolic Programming System), a 12-digit system with rounding, and FORTRAN, an 8-digit system with cut-off, for integrating two differential equations (each of a different type) with known solutions on the IBM 1620 Computer. The first differential equation is non-linear and propagates round-off and truncation errors badly. The second, Bessel's differential equation of order zero, is rather stable, except at the origin. Various intervals of integration (ranging from .05 to .002) were used with the Runge-Kutta fourth order integration formula. The results list the exact values, the calculated values, and errors associated with the two methods. Sample Fortran and SPS programs are given. (Author)

AD-274 550 Div. 30
(TISTP/FR) OTS price $2.60

Thompson Ramo Wooldridge, Inc., Canoga Park, Calif.
AN/FSQ-27 POLYMORPHIC DATA PROCESSING SYSTEM STUDIES.
Final program rept., 1 July-31 Dec 61. 31 Jan 62, 25p. incl. illus. (Rept. no. C24-2U4) (Contract AF 30(602)1814, Proj. 1763) (RADC TDR 62-111)
Unclassified report

DESCRIPTORS: (*Data processing systems, Data transmission systems, Digital computers, Air force operations.)

A definitive record of work performed in the exploitation of multiple computer concepts embodied in the AN/FSQ-27 Data Processing Central is given. (Author)

AD-274 604 Div. 30, 8
(TISTE/CAM) OTS price $2.60

Radiation, Inc., Palo Alto, Calif.
SUPER-POWER KLYSTRON TUBE-TEST FACILITY.
Quarterly rept. no. 5, 1 Oct-31 Dec 61,
by Roby L. Blessing. 31 Dec 61, 27p: incl.
illus. (Rept. no. G-108)
(Subcontract to Varian Associates, Palo Alto,
Calif.)

Unclassified report

DESCRIPTORS: (*Klystrons, Test equipment, *Test facilities, Construction.) (Modulators, *Modulator tubes, Pulse generators, Pulse transformers, Resistors, Transmission lines, Power supplies, Electronic switches, Electronic circuits, Switching circuits, Design, Production, Tests.) (*Triodes, Modulator tubes.)

This report includes:
Machlett Labs., Inc., Springdale, Conn.
DEVELOPMENT OF A 350-kV, 25-AMPERE PULSE TRIODE.
Quarterly rept. no. 5, 1 Oct-31 Dec 61,
by H. Langer and C. V. Weden.
(Subcontract to Radiation, Inc., Palo Alto,
Calif.)

Efforts continued on the evaluation of Machlett Switch Tube #2. The high-voltage power supply plate transformer and the klystron filament transformer were tested. Tests continued on the interim modulator pulse generator and crowbar circuits. The preliminary high-voltage transmission line design was completed and effort was placed on the klystron tank layout. Production engineering effort was expended on the high-voltage transmission line design, klystron tank layout, finalizing the input power control layout design, finalizing the dc dummy load, and completing the remaining assembly drawings for the control console. Production effort continued on the interim modulator pulse transformers, final assembly and wiring of the interim modulator switch drive, controls console wiring and construction of the input power control unit. The klystron cathode resistor and the pulse-viewing resistor were completed. (Author)

AD-274 626 Div. 30, 9
(TISTP/WH) OTS price $3.60

University of Southern Calif. Engineering Center, Los Angeles.
PRESSURE LAG THROUGH ORIFICES AND SHORT TUBES FOR SMALL PRESSURE RATIOS AND FLOW CONDITIONS FROM FREE MOLECULE TO CONTINUUM,
by J. G. Everton and Frederick O. Smetana.
Jan 62, 26p. incl. illus. 8 refs. (USCEC rept. no. 83-211)
(Contract AF 49(638)831; Subcontract to Fairchild Camera and Instrument Corp., Contract AF 33(657)7715)
(AFOSR-2360) Unclassified report

DESCRIPTORS: (*Re-entry vehicles, Instrumentation.) (*Transducers, *Pressure, Atmosphere, Air.) (Gases, Compressible flow, Supersonic aerodynamics.) (Pressure gages, Gases.) Time.

Experiments were conducted to determine the time required for the pressure in a one-liter volume to rise to 63% of final value when filled through a short tube. Tube length to diameter ratios of 0.5 to 8.0 were tested. Initial pressure in the volume ranged from about 25 micron to about 25 mm. The pressure at the upstream end of the fill tube was maintained at 1.25 times the initial pressure in the volume for all runs. A rapidly acting pneumatic valve was opened to connect the two chambers. It was found that the fill time could be predicted quite satisfactorily at both pressure extremes by variants of conventional theory. At intermediate pressures, however, no satisfactory theoretical prediction was found. (Author)

AD-274 634 Div. 30
(TISTP/MFA) OTS price $2.60

Washington U., Seattle.
SYMMETRIC CORRELATION AND PRINCIPAL AXIS FACTOR ANALYSIS PACKAGE FOR THE IBM TYPE 709,
by Frank Nussbaum and David Marshall. Oct 61,
23p. incl. tables, 6 refs.
(Contract Nonr-47708)

Unclassified report

DESCRIPTORS: (*Data storage systems, Digital computers, *Punched card methods, Sequences, Coding, *Programming, Factor analysis, Transformations (Mathematics).) (*Computers, Computer logic, Magnetic tape.) (Tests, Analysis.)

The symmetric correlation and principal axis factor analysis package consists essentially of a main control program and three subprograms which may be used separately or in combination. Its main tasks are to normalize a raw data matrix, compute a correlation matrix, extract principal axis factors, and transform a normalized data matrix to a form from which a factor score matrix may be easily obtained. The various uses of the program demand certain equipment. The minimum number of tape units required is two, the two standard MONITOR units 5 and 6. A maximum of 9 tape units is required, however, if all the options for writing BCD and binary tapes for data storage are used for a run. Many features of the program make it especially adaptable to general and specialized research needs. The program fits well into a systems library of research computer programs since it is planned to both accept from and provide data for other existing and projected programs. It can accept almost any input data format since it contains a provision for variable input format. It prints its output data in a form that is clear, well-labeled, and readily tabulated. (Author)

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

AD-274 659 Div. 30, 2
(TISTP/FR) OTS price $3.60

Acoustics and Seismics Lab., U. of Michigan, Ann Arbor.
DESCRIPTIONS OF COMPUTER PROGRAMS FOR SEISMIC ANALYSIS.
VESIAC Special rept.,
comp. by William D. McLean. Apr 62, 39p.
(Rept. no. 4410-17-X)
(Contract SD-78) Unclassified report

DESCRIPTORS: (*Seismic waves, Mathematical analysis, Digital computers, *Programming, *Bibliography.)

Descriptions of 129 computer programs and subroutines which are useful in seismic analysis are given. Each program is listed according to its originating institution, with as much descriptive information as was available. A page-number index lists the programs by title. (Author)

AD-274 689 Div. 30
(TISTP/TL) OTS price $5.60

Stanford Research Inst., Menlo Park, Calif.
CODES AND CODING CIRCUITRY FOR AUTOMATIC ERROR CORRECTION WITHIN DIGITAL SYSTEMS,
by William H. Kautz. Jan 62, 49p. incl. illus. tables, 28 refs. (Technical rept. no. 2)
(Subcontract to Jet Propulsion Labs., Calif. Inst. of Tech., Pasadena, Contract NASw-6)
Unclassified report

DESCRIPTORS: (Coding and *Switching circuits for Automatic, *Errors, Corrections within *Digital systems.) (Communication systems, Computer logic.) (*Data transmission systems, Electrical networks, Detection.) Matrix algebra, *Digital computers.

The efficiency, cost, and optimality of codes are discussed for use within digital systems, and the extent to which known code families can be applied to automatic error correction is evaluated. To better satisfy these criteria in the most important remaining cases, some new codes are described. Particular attention is devoted to error correctors which are fault-masked - i.e., whose performance is insensitive to single isolated circuit faults. Also discussed are the simplifications possible if mere detection of an error is adequate. Several examples of encoding, corrector, and detector circuits are offered, exemplifying the use of both gate-type and branch-type logical elements. (Author)

AD-274 702 Div. 30, 8
(TISTP/WFA) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
FAST-SLOW DIFFERENTIATOR CIRCUIT DESIGN FOR A PROTON SPECTROMETER,
by F. S. Mozer and J. D. Mihalov. 28 Feb 62, 8p. incl. illus. (Rept. no. TDR-930(2260-21)TN-1)
(Contract AF 04(647)930)
(DCAS TDR 62-66) Unclassified report

DESCRIPTORS: (*Circuits, Design, *Transducers, *Proton accelerators.) (Cesium compounds, Iodides, Crystals.) (Instrumentation, Electron multipliers, Phototubes.) (*Satellite vehicle research, Flight paths, Flight testing.)

The fast-slow differentiator circuit for the proton spectrometer developed to measure the radiation environment of the ADVENT satellite orbit has undergone further analysis and design. The design philosophy and electronic circuitry utilized to distinguish the source of light pulses observed by the photomultiplier tube are described. (Author)

AD-274 719 Div. 30, 15
(TISTP/TL) OTS price $1.60

Metcalf Research Lab., Brown U., Providence, R. I.
BROWN CRYSTALLOGRAPHIC FOURIER SYNTHESIS PROGRAM, BXFS,
by Gene B. Carpenter and Gordon T. Wilmot.
Apr 62, 12p. incl. tables (Technical rept. no. 10)
(Contract Nonr-56204, Proj. NR-017-607)
Unclassified report

DESCRIPTORS: (*Computers, *Synthesis and *Programming of *Fourier analysis, Series.) (Theory and Structures of *Data processing systems, *Data storage systems.) (Errors, Numerical analysis, Sequences.)

This relatively simple two- and three-dimensional Fourier synthesis program, designated BXFS, was written for a limited configuration of the IBM 7070 computer. The BXFS (Brown Crystallographic Fourier Synthesis) program is designed to be fast and simple at the cost of some sacrifice of flexibility. This approach was chosen because of the limited storage capacity (5000 words) of the Brown IBM 7070 installation. The essential simplifying feature is the limitation of groups of input data, intermediate sums, or final results to blocks of exactly 16 x 16 = 256 items. This is achieved by evaluating the synthesis at intervals of 1/60 in each coordinate and by limiting the indices which may be accommodated to a maximum absolute value of 31 for each. However, a coordinate interval of 1/30 may be chosen by doubling the corresponding indices. (Author)

AD-274 802 Div. 30, 15
(TISTP/JW) OTS price $8.10

Systems Research Center, Case Inst. of Tech., Cleveland, Ohio.
THE CONTROL OF LINEAR MULTIVARIABLE SYSTEMS,

by Roger Brockett. 1 Jan 62, 77p. 34 refs.
(Contracts Nonr-114109 and Nonr 114112)
Unclassified report

DESCRIPTORS: (Data processing systems, *Cybernetics, Automation, Computers.) (Mathematical prediction, *Matrix algebra, Complex variables, Integral equations.)

Analytical methods for designing multivariable systems are discussed and it is shown that many problems in linear multivariable system synthesis such as the design of Wiener filters and the optimization of the transients of multivariable plants lead to vector Wiener-Hopf equations. A new approach is developed with the following advantages: computational labor is reduced, the performance functional may be evaluated directly without solving the minimization equation, and explicit solutions are obtained in terms of the significant system properties. The methods are applied to example problems and attention is given to the problem of comparing the optimum decoupled response to the optimum response with interaction allowed. As a result of these studies a property termed cohesion is defined which indicates to what extent the system depends on interaction for optimum performance. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-274 549 Div. 31
(TISTW/RD) OTS price $3.60

Electric Boat Div., General Dynamics Corp., Groton, Conn.
ALTERNATIVE AUTOPILOT CONFIGURATIONS FOR AUTOMATIC SUBMARINE CONTROL.
Rept. on Proj. SUBIC,
by R. J. Kochenburger, C. H. Knapp and R. A. Abate. Sep 61, 36p. incl. illus. (Rept. no. U417-61-005)
(Contract Nonr-251200)
Unclassified report

DESCRIPTORS: (Automatic, Control, Control systems, *Submarines, Automatic pilots, Depth indicators.)

Various control techniques are discussed that permit automatic maneuvering and keeping of a submarine on course and depth. The work described was performed for submarines of the 608 class but is expected to be applicable to other submarines. All techniques are characterized by an appropriate coupling of stern and fairwater planes to eliminate reversal of control at low speeds. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-274 816 Div. 32
(TISTP/FR) OTS price $2.75

Computation Lab., Harvard U., Cambridge, Mass.
INFORMATION STORAGE AND RETRIEVAL,
by Gerard Salton. 30 Nov 61, 152p. incl. illus. tables, refs. (Scientific rept. no. ISR-1)
(Contract AF 19(604)8509, Proj. 5632)
(AFCRL 62-77) Unclassified report

DESCRIPTORS: (*Information retrieval, *Vocabulary.)

Some experimental procedures for the identification of information content, using word frequency counting techniques are described. An attempt is made in particular to determine those areas in a natural language text which contain more than an average amount of new information. The use of tree structures for the representation of relations between terms included in classification systems, and between words in the natural language is discussed. Procedures are also suggested for the automatic identification of structural relations, and for the use of trees to perform the matching process. Some problems connected with the use of syntactic analysis for the identification of document content, and various strategies which appear useful for the processing of structured information are discussed. Methods are described for the efficient representation of tree structures in computer storage. Programs are also exhibited to perform a variety of information retrieval operations. (Author)

33. TRANSPORTATION

No Entries

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

BIBLIOGRAPHY

XDC-60-4-61 $17.50

General Electric Co., Cincinnati, Ohio
SOVIET SCIENTIFIC AND TECHNICAL LITERATURE. Selected bibliography. Volume II. Mar 62, 277p.

TID-15194 $1.10

Los Alamos Scientific Lab., N. Mex.
TEMPERATURE ANALYSIS OF HOLLOW CYLINDRICAL FUEL ELEMENTS. A BIBLIOGRAPHY, comp. by Helen S. Stearns. Rept. on Contract W-7405-eng-36. 11 Mar 60, 8p.

AGRICULTURE

TID-14388 $10.50

Minnesota U., St. Paul
RADIONUCLIDE CYCLING IN AGRICULTURAL PLANTS. Technical progress rept. 1 Mar 61-28 Feb 62, on Contract AT(11-1)-783. Nov 61, 133p. 17 refs.

TID-15125 $4.60

Utah State U., Logan.
THE MINERAL CONTENT OF VARIOUS SECTIONS OF SOME PLANTS AS INFLUENCED BY CONDITIONS ASSOCIATED WITH LIME-INDUCED CHLOROSIS, by Hyrum Del Var Peterson. Master's thesis. Rept. on Contract AT(11-1)-1055. 1961. 46p.

ASTRONOMY

NASA N62-10744 $8.10

Rand Corp., Santa Monica, Calif.
THE ASTRONOMICAL UNIT OF DISTANCE: SOLAR PARALLAX AND RELATED CONSTANTS, by G. de Vaucouleurs. Dec 61. xiii, 72 p. 81 refs. MEMO. RM-2944-NASA; NASA Contract NASr-21(04).

Order from GPO $0.70 as D 213.9:16/pt. 2

Nautical Almanac Office, Washington, D. C.
THEORY OF MARS; COMPLETION, PREPARED FOR THE USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC, by G. M. Clemence. 1961, 72p. Pub. in Astronomical Papers 16:pt. 2, p. 261-333.

DESCRIPTORS: Planets *Mars, Motion, Theory, Perturbation theory, *Astronomical data, Numerical analysis, Differential equations, Integration.

This Paper completes the theory of the motion of Mars of which the first-order portion appeared as Volume XI, Part 2 of the same series in 1949. It was there stated that my goal was to attain a precision of 0".01 in the geocentric position of the planet for five centuries or more before and after 1850. The theory is, considerably more precise than any other general planetary theory yet constructed. (Author)

Astrophysics

Order from GPO $0.30 as SI 1.12/2:5/11

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
ON THE Λ AND ϕ OPERATORS OF RADIATIVE TRANSFER THEORY, by S. S. Kumar. 1962, 32p. 6 refs.
Pub. in Smithsonian Contributions to Astrophysics 5: no. 11, p. 153-185

DESCRIPTORS: Stars, *Star models, Atmosphere, *Heat transfer, Theory, Special functions, *Operators (Mathematics), Tables, Astrophysics.

The importance of Λ and ϕ operators for the problem of transfer of radiation in nongray stellar atmospheres is discussed, and extensive tables of these operators of the functions e^{-dr} and τ^m are given. (Author)

NASA N62-10800 $1.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
RESEARCH IN SPACE SCIENCE. [Subtitle] The Analysis of Gravity, by Harold Jeffreys (Cambridge U.) 30 Oct 61. 12p. 7 refs. SAO Special Rep No. 79; NASA Grant NsG 87-60.

NASA N62-10876 $1.60

Dudley Observatory, Albany, N.Y.
COLLECTION AND ANALYSIS OF MICROMETEORITES. Semi-Annual Status Report, 1 June - 1 Dec 61, by Curtis L. Hemenway, Herbert A. Cohen, and Royce E. Coon. [1961?] 13p. 1 ref. NASA Grant NsG 155-61.

NASA N62-10811 $3.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
A PROGRAM OF RESEARCH FOR THE DETERMINATION OF RARE-EARTH ABUNDANCES IN METEORITES. Quarterly Progress Report for the Period Ending 15 Dec 61, by R. A. Schmitt and R. H. Smith. 29 Dec 61. 40p. 26 refs. GA-2782, rev.; NASr-75.

NASA N62-10898 $1.10

Iowa State U., Iowa City
RESEARCH IN SPACE SCIENCE. Progress Report for 10 May-9 Nov 61, by J. A. Van Allen. 9 Nov 61. 9p. 11 refs. NASA Contract NASw-17.

NASA N62-10805 $5.60

Rand Corp., Santa Monica, Calif.
A CHARGE-SEPARATION MECHANISM FOR THE PRODUCTION OF POLAR AURORAS AND ELECTROJETS, by J. W. Kern. Mar 62. vii, 45p. 36 refs. MEMO. RM-3058-NASA: NASA Contract NASr-21(05).

BEHAVIORAL SCIENCES

Personnel and Training

AD-274 190 repriced $0.75

Behavioral Sciences Lab., Aerospace Medical Div., Wright-Patterson AFB, Ohio.
SPACECREW TRAINING: A REVIEW OF PROGRESS AND PROSPECTS, by Gordon A. Eckstrand and Marty R. Rockway. Rept. on Training, Personnel, and Psychological Stress Aspects of Bioastronautics. Dec 61, 29p. 16 refs. ASD Technical rept. 61-721.

DESCRIPTORS: *Space flight, Manned, Attitudes, *Aviation personnel, *Training, Stress (Psychology), Human engineering.

Descriptions of all current astronaut training programs are presented, and a number of general conclusions with reference to such training are drawn, based upon the manned space operations which have been conducted to date. In addition to the actual experience which has been gained in training space crew personnel, a review is presented of recently completed and current research which is directly relevant to this problem. Several areas in which research should be accelerated are identified. (Author)

PB 181 193 $1.75

National Research Council, Washington, D. C.
MAN LIVING IN THE ARCTIC. PROCEEDINGS OF A CONFERENCE. QUARTERMASTER RESEARCH AND ENGINEERING CENTER, NATICK, MASSACHUSETTS 1, 2 DECEMBER 1960, ed. by Frank R. Fisher. 152p. 67 refs.

DESCRIPTORS: Conferences, Military research, Military personnel, Personnel, *Man, Climatic factors, Physiology, Stress (Physiology), Clothing, Protective clothing, Food, Psychiatry, Logistics, Survival, *Arctic regions.

Contents:
Address of welcome, by Brig. General Merrill L. Tribe
The significance of logistics in the Arctic, by Maj. General A. T. McNamara
Significance of research and development in the Arctic, by Lt. General A. G. Trudeau
Limitations to living in the polar regions, by Paul A. Siple
The cold-climate man, by H. T. Hammel
Alaska--Gibraltar of the North, by Colonel Willard Pearson
Physiological principles for protection of man in the cold, by Harwood S. Belding
Clothing and personal protection, by S. J. Kennedy
Arctic rations, by Austin Henschel
Quartermaster environmental research in the Arctic, by William C. Robison
Health maintenance, by Colonel Joseph Blair
Physiological problems in polar regions, by O. G. Edholm
Auxiliary heating, by John P. Meehan
Psychiatric problems of man in the Arctic, by David McK. Rioch
Man's future conquest of the Arctic, by Steven M.. Horvath
Utilization of the Arctic's natural resources, by Paul Queneau
Human society in the Arctic today, by Trevor Lloyd
The role of politics in the expanding utilization of the Arctic, by George W. Rogers
Dedication of the Wilkins Arctic Test Chamber, by Maj. General Andrew T. McNamara

BIOLOGICAL SCIENCES

PB 160 004 $3.60

Battelle Memorial Inst., Columbus, Ohio.
RELATIONS OF ODOR TO PHYSICO-CHEMICAL PROPERTIES OF COMPOUNDS, by Howard G. Schutz, Robert B. Iden and others. Annual rept. no. 4, 5 Dec 59-5 Dec 60, on Contract DA 19-129-qm-1500. [1961] 36p. 13 refs. QFCIAF File no. P-1115; AD-254 685.

DESCRIPTORS: *Olfactory thresholds, *Odors, *Factor analysis, Chromatographic analysis, Chemical properties, Physical properties, Measurement, Classification, Psychology, Determination, Statistical analysis, Adsorption, Tissues (Biology).

Rank-order intercorrelation matrix was computed for 18 physicochemical and 12 subjective odor parameters over 30 odorants. A multiple-group factor analysis was conducted on the physicochemical matrix and rotated to simple structure. Five factors which resulted were named according to physical and olfactory process involved. Multiple-regression analyses were conducted for 8 subjective odor parameters using selected physicochemical properties. Multiple R's ranged from 0.36 to 0.79. Experiments were conducted with gas chromatographic columns analogous to olfactory process including mucous (albumin), serous fluid (blood serum), nerve tissue (brain homogenate), and cholinesterase inhibiting property (wool). Tables were prepared giving retention times for the odorants studied. A model acetylcholinesterase system was set up for use in testing how odorants affect such a system. (Author)

TID-12946(App. 1)(Vol. 1) $9.10

Bermuda Biological Station, St. George's West
THE BIOCHEMICAL CIRCULATION OF ELEMENTS IN THE SARGASSO SEA, by John H. Ryther and David W. Menzel. Appendix 1. Scientific Reports, volume 1. Appendices to progress rept. 1 Sep 60-31 Aug 61, on Contract AT(30-1)-2646. 18 Sep 61, 102p. 93 refs.

TID-12946(App. 1)(Vol. 2) $8.60

Bermuda Biological Station, St. George's West
THE BIOCHEMICAL CIRCULATION OF ELEMENTS IN THE SARGASSO SEA, by John H. Ryther and David W. Menzel. Appendix 1. Scientific Reports, volume 2. Appendices to progress rept. 1 Sep 60-31 Aug 61, on Contract AT(30-1)-2646. 18 Sep 61, 93p. 34 refs.

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Bermuda Biological Station, St. George's West
THE BIOCHEMICAL CIRCULATION OF ELEMENTS IN THE SARGASSO SEA, by John H. Ryther and David W. Menzel. Appendix 2. Reduced Data. Appendices to progress rept. 1 Sep 60-31 Aug 61, on Contract AT(30-1)-2646. 18 Sep 61, 56p.

NASA N62-10687 $2.60

Corbin-Farnsworth, Inc., Palo Alto, Calif.
STUDY PROGRAM FOR THE DEVELOPMENT OF A BLOOD PRESSURE MEASURING AND MONITORING SYSTEM FOR REMOTE USE ON MAN IN FLIGHT. Final Report, by Thomas Corbin. 15 Mar 62. 29p. 16 refs. NASA Contract NASr-35.

OTS SB-495 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
PARASITOLOGY, PARASITES, AND PARASITIC INFECTIONS (ANIMAL, INCLUDING HUMAN). Apr 62, 22p. 372 refs. OTS Selective Bibliography SB-495.

DESCRIPTORS: *Parasitology, Parasites, *Parasitic infections.

List 372 domestic and foreign references on parasitology, parasites, and parasitic infections added to the OTS collection up to May 1, 1962. Includes reports on parasitology and parasites (general); helminths (general, and specific; trematodes, cestodes, nematodes, acanthocephala); arthropods (ticks, mites, diptera, lice, fleas, flies, etc.); protozoa (plasmodium, leishmania, trypanosoma, coccidia, toxoplasma, piroplasma, etc.); parasitic infections (general, and specific: echinochasmosis, fascioliasis, leishmaniasis, malaria, piroplasmosis, sarcosporidiosis, schistosomiasis, tick-borne encephalitis, toxoplasmosis, etc.).

Biochemistry

AD-274 038 repriced $1.00

Armour Research Foundation, Chicago, Ill.
APPLIED RESEARCH CONCERNING ARTIFICIAL PHOTOSYNTHESIS, by J. A. Gross, Milton J. Becker, and A. M. Shefner. Rept. for 1 May 60-30 Sep 61, on Equipment for Life Support in Aerospace, Contract AF 33(616)7255. Jan 62, 39p. 43 refs. ARF 3174-17; MRL-TDR-62-5.

DESCRIPTORS: *Photosynthesis, Simulation, Plant pigments, *Chlorophylls, Plants, *Spinach, Biochemistry, Fragmentation, Electron transitions, Nitrogen, Proteins, Oxygen, Cytochromes, Photochemistry, Closed cycle ecological systems.

The structure, biochemistry, and photosynthetic function of the spinach chloroplast was investigated in a search for knowledge to permit a similar active system to be synthesized. Chloroplasts were isolated and fragmented. Relatively narrow-range size groupings of the fragments were obtained by differential centrifugation. These fractions were assayed physiologically and chemically. Maximal functional activity, in terms of electrons transferred or oxygen evolved under illumination, was found in particles sedimenting between 20×10^3 g and 50×10^3 g. Various anion concentrations were tested. An attempt to obtain photoactivity from a dried chloroplast layer, a first approximation of an artificial system, was partially successful. The studies indicate that activity in the fractions varies, probably reflecting altered structural or chemical composition. Differences in protein nitrogen concentration and chlorophyll: protein ratios are evidence of chemical changes. Results are discussed in relation to proposed models for the fine structure of the chloroplast and the basic photosynthetic unit. (Author)

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Columbia U. Coll. of Physicians and Surgeons, New York.
STUDY OF THE CONDENSING UNITS IN NUCLEIC ACID BIOSYNTHESIS, by T. Duane Price. Rept. for 1 June 61-31 May 62, on Contract AT(30-1)-2208. 28 Feb 62, 26p.

TID-15152 $1.60

John Hopkins U. School of Hygiene and Public Health, Baltimore, Md.
PHOTOCHEMISTRY OF DEOXYRIBONUCLEIC ACIDS, by Shih Yi Wang. Rept. on Contract AT(30-1)-2798. [1961] 16p.

TID-15136 $1.60

John Hopkins U. School of Hygiene and Public Health, Baltimore, Md.
STUDY OF PHOTO-CHEMICAL EFFECTS OF ULTRAVIOLET IRRADIATION NUCLEIC ACIDS AND RELATED COMPOUNDS, by Shih Yi Wang. Annual progress rept. 1 June 61-31 May 62, on Contract AT(30-1)-2798. 12p.

UCRL-10032 $2.50

Lawrence Radiation Lab., U. of California, Berkeley.
BIO-ORGANIC CHEMISTRY QUARTERLY REPORT, Sep-Nov 61, on Contract W-7405-eng-48. 25 Jan 62, 128p. 140 refs.

TID-15061 $1.10

Michigan State U., East Lansing.
THE BIOSYNTHESIS OF TERTHIENYL. Progress rept., 7 June 61-15 Feb 62 on Contract AT(11-1)-1034. 4p.

NASA N62-10897 $1.10

Minnesota U., Minneapolis
PHOTOSYNTHESIS, CLOSED ECOLOGICAL SYSTEM. Status Report, by H. M. Tsuchiya and A. G. Fredrickson. 22 Mar 62. 6p. NASA Grant NsG 79-60.

TID-15064 $1.60

Montefiore Hospital, Inst. of Research, Pittsburgh, Pa.
PATHWAYS OF NUCLEIC ACID SYNTHESIS, by Richard Abrams. Progress rept. 1 Feb 61-31 Jan 62, on Contract AT(30-1)-1818. 15 Feb 62, 20p.

TID-15151 $1.60

South Dakota State Coll., Brookings
METABOLISM OF SULFATE, by E. I. Whitehead. Progress rept. 1 June 61-28 Feb 62, on Contract AT(11-1)-1031. 13p.

Radiobiology

BNL-715(T-251) $0.50

Brookhaven National Lab., Upton, N. Y.
A DESCRIPTIVE TECHNIQUE FOR STUDY OF THE EFFECTS OF CHRONIC IONIZING RADIATION ON A FOREST ECOLOGICAL SYSTEM, by George M. Woodwell and E. Cuyler Hammond. Mar 62, 15p.

TID-15044 $3.60

California U., Los Angeles. School of Medicine.
ACCUMULATION OF Cs AND K AND GROWTH OF BEAN PLANT IN NUTRIENT SOLUTION AND SOILS, by H. Nishita, D. Dixon, and K. H. Larson. Rept. on Contract AT(04-1)-Gen-12. Feb 62, 31p.

HW-72500 $3.00

Hanford Atomic Products Operation, Richland, Wash.
HANFORD BIOLOGY RESEARCH ANNUAL REPORT FOR 1961, ed. by H. A. Kornberg and E. G. Swezea. Rept. on Contract AT(45-1)-1350. 15 Jan 62, 192p. 135 refs.

TID-14994 $1.10

Instituto di Zoologia e Antomia Comparata, Parma (Italy)
THE ECOLOGY OF "ACANTHARIA" IN RELATION OF THE CIRCULATION OF Sr IN THE SEA, by Bruno Schreiber. Progress rept. on Contract AT(30-1)-2607. 30 Sep 61, 5p.

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Johns Hopkins U., Baltimore, Md.
THE ACTION OF RADIATION AND OTHER MUTAGENIC AGENTS (1) IN INDUCING MUTATION IN DROSOPHILA FEMALES, AND (2) IN CONTROLLING THE ACTION OF SPECIFIC GENES RESPONSIBLE FOR SUPPRESSING UNCONTROLLED GROWTH, by H. Bentley Glass. Rept. covering 9-year period, 1 May 53-30 Apr 62, on Contract AT(30-1)-1472. 8 Feb 62, 22p.

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Michigan U., Ann Arbor.
THE EFFECT OF IRRADIATION ON THE LOCALIZING RESPONSE (TO ANTIGEN) OF DIFFERENT TISSUES IN IMMUNITY, by Arthur C. Curtis. Progress rept., 15 May 62-14 May 63, on Contract AT(11-1)-70. Jan 62, 14p.

TID-15155 $1.60

Michigan U., Ann Arbor
PROGRESS REPORT ON MONITORING OF THYROIDEL I^{131} CONCENTRATION on Contract AT(11-1)-70. 22 Feb 62, 15p.

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THE TUMOROGENIC ACTION OF BETA RADIATION ON THE RAT SKIN, by Roy E. Albert. Progress rept on Contract AT(20-1)-2785. 1962. 15p.

TID-15060 $2.60

Utah U., Salt Lake City.
RADIATION EFFECTS ON PLANTS, by John D. Spikes. Progress rept., 1 Apr 61-15 Jan 62, on Contract AT(11-1)-875. 15 Jan 62. 26p.

TID-15084 $1.10

Yale U., School of Forestry, New Haven, Conn.
EFFECT OF IONIZING RADIATION ON FOREST TREES. ITS GENETIC AND CYTOLOGICAL IMPLICATIONS, by Francois Mergen. Progress rept. 1 June 61-31 May 62, on Contract AT(30-1)-2755. 28 Feb 62, 11p.

CHEMISTRY

NASA N62-10685 $1.60

Beckman Instruments, Inc., Fullerton, Calif.
SPACEBORNE GAS CHROMATOGRAPH. PHASE II. Second Quarterly Status Report, 1 Dec 61-1 Mar 62, by R. D. Cook and Merton Robinson. [1962] 16p. 2 refs. NASA Contract NASr-76.

TID-15148 $7.60

Purdue U., Lafayette, Ind.
THE CHEMISTRY AND NUCLEAR CHEMISTRY OF THE HEAVY ELEMENTS, ed. by J. W. Cobble, Progress rept. no. 7 on Contract AT (11-1)-347. Feb 62, 75p.

Analytical Chemistry

TID-11411 $1.10

Knolls Atomic Power Lab., Schenectady, N. Y.
THE DETERMINATION OF NITROGEN IN ZIRCALOY AND OTHER ALLOYS; A SIMPLIFIED DISTILLATION APPARATUS, by J. R. Ciaranello. Rept. on Contract W-31-109-eng-52. Mar 62, 9p.

TIM-406 $1.60

Pratt and Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn.
A FLAME SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF NICKEL AND BORON IN PLATING SOLUTIONS, by D. E. Fornwalt. Rept. on Contract AT(11-1)-229. 6 May 57, 25p.

DP-704 $0.50

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A MAGNETIC MIXER FOR LIQUIDS, by G. B. Alewine and C. K. Nicholson. Rept. on Contract AT(07-2)-1. Mar 62, 8p. 2 refs.

DP-673 $0.50

Savannah River Lab., Aiken, S. C.
PRECISE DETERMINATION OF NEPTUNIUM BY COULOMETRY, by Myron O. Fulda. Rept. on Contract AT(07-2)-1. Feb 62, 8p. 3 refs.

Physical Chemistry

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THE USE OF MICROHARDNESS IN THE DETERMINATION OF THE DIFFUSIVITY OF OXYGEN IN ALPHA ZIRCONIUM, by J. J. Kearns and J. N. Chirigos. Rept. on Contract AT(11-1)-GEN-14. Feb 62, 22p. 10 refs.

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SOME PHOTOCHEMICAL AND THERMODYNAMIC PROPERTIES OF URANYL COMPLEXES, by John R. Lacher and Joseph D. Park. Technical progress rept. on Contract AT(11-1)-753. Feb 62, 31p.

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Institute of Metals and Explosives Research, U. of Utah, Salt Lake City
INFRARED EVIDENCE FOR BISULFATE FORMATION IN THE DEHYDRATION OF MAGNESIUM SULFATE, by J. S. Cho, F. A. Olson, and M. E. Wadsworth. Technical rept. no. 1, on Contract W-7405-eng-26. 5 Oct 61, 25p. 16 refs.

NYO-8121 $2.60

New York U., N. Y.
REVIEW AND COMMENTARY ON SOME RUSSIAN WORK ON TRANSPORT PROPERTIES IN MOLTEN OXIDES, by Alexandre Berlin. Rept. on Contract AT(30-1)-1837. 19 Feb 62, 24p.

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Pennsylvania State U., University Park.
THE MECHANISMS OF FISSION GAS DIFFUSION IN GRAPHITE, by W. S. Diethorn and P. L. Walker, Jr. Summary rept. 1 June 61-31 May 62, on Contract AT(30-1)-2792. 20 Feb 62, 19p.

TID-15218 $1.60

Syracuse U., N. Y.
THE LITHIUM-STRONTIUM EQUILIBRIUM SYSTEM, by Frederick E. Wang, Frank A. Kanda, and Aden J. King. Rept. on Contract AT(30-1)-1910. 1961. 19p. Publication no. 1.

TID-15160 $2.60

Taylor U., Upland, Ind.
DIFFUSION OF RADON AND TRITIUM THROUGH SEMIPERMEABLE MATERIALS, by Elmer Nussbaum. Technical progress rept. on Contract AT(11-1)-649. Mar 62, 27p.

EARTH SCIENCES

PNE-110P $2.00

Coast and Geodetic Survey, Washington, D. C.
SEISMIC WAVES FROM AN UNDERGROUND EXPLOSION IN A SALT BED, by D. S. Carder, W. V. Mickey and others. Preliminary rept. on Plowshare Program, Project Gnome, Contract AT(29-2)-746. 12 Apr 62, 99p. 48 refs.

Climatology and Meteorology

PB 161 643 $2.50

National Bureau of Standards, Boulder, Colo.
ATLAS OF FOURIER COEFFICIENTS OF DIURNAL VARIATION OF foF2, by William B. Jones. Apr 62, 111p. 3 refs. Technical note 142.

DESCRIPTORS: *Ionosphere, *Solar noise, *Fourier analysis, Radio waves, Propagation, Meteorological data, *Diurnal variations.

A series of graphical representations is given for illustrating the regular and continuous geographic variations of Fourier coefficients a_j and b_j obtained from the diurnal analysis of foF2 monthly medians, including their main latitudinal trend, mixed latitudinal and longitudinal variation, and the effect due to noise (random fluctuation in the original data). To illustrate the systematic changes in these variations with seasons and with solar activity, corresponding graphs are given for four seasonal months for minimum and maximum years of solar activity (1954 and 1958). (Author)

PB 161 639 $1.00

National Bureau of Standards, Boulder, Colo.
CORTES VERTICALES DE LA IONÓSFERA A TRAVÉS DEL ECUADOR GEOMAGNÉTICO, by J. W. Wright, Trans. by Sandro M. Radicella (Universidad Nacional de Tucuman). Rept. on Contract NTF-84. 6 Apr 62, 39p. 4 refs. Technical note no. 138. Text in Spanish.

DESCRIPTORS: *Ionosphere, Meteorological charts, Analysis, Electrons, Density, *Terrestrial magnetism.

Se muestran los perfiles de ionización, a lo large de un meridiano cruzando el ecuador geomagnético, para cada hora de un perfodo tranquilo durante Marzo de 1958. Por medio de estos perfiles se ilustran y discuten fenomenologicamente las anomalías ionosféricas ecuatoriales. Se describen los procesos físicos probables. (Author)

PB 161 636 $2.50

National Bureau of Standards, Boulder, Colo.
IONOSONDE OBSERVATIONS OF ARTIFICIALLY PRODUCED ELECTRON CLOUDS: FIREFLY 1960, by J. W. Wright. Rept. on Contract PRO 60-599. 1 Apr 62, 117p. 9 refs. Technical note no. 135.

DESCRIPTORS: *Atmospheric sounding, Ionosphere, Upper atmosphere, Solar flares, Chemical reactions, Instrumentation, Drift, Clouds, Motion, Electrons, Density, Radiofrequency, Meteorological data, Radar echo areas, Meteorites.

Ionospheric soundings obtained at four sites near Eglin AFB during Firefly 1960 are analyzed for Point Electron Cloud position and movement. The condition of the ionosphere during these experiments is discussed and compared with conditions during the Firefly 1959 series. (Author)

SC-4853(RR) $0.50

Sandia Corp., Livermore, Calif.
DEFINING EXTREME DESERT ENVIRONMENTS WITH MICROCLIMATOLOGICAL MEASUREMENTS, by C. A. Scott. May 62, 24p. 12 refs.

Geology

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Geological Survey, Washington, D. C.
BENTONITE DEPOSITS OF THE NORTHERN BLACK HILLS DISTRICT WYOMING, MONTANA, AND SOUTH DAKOTA. AN INVESTIGATION OF THE DISTRICT THAT HAS SUPPLIED MOST OF THE GEL-FORMING SODIUM-TYPE BENTONITE PRODUCED TC DATE IN THE UNITED STATES, by Maxwell M. Knechtel and Sam H. Patterson. 1962, 1030p. 76 refs. Geological Survey bulletin 1082-M.

DESCRIPTORS: *Bentonite, Deposits, Montana, *South Dakota, *Wyoming, Production, Geological survey.

The overall geologic structure of the district is that of a broad northwestward-plunging anticline, in which the strata dip gently toward the northeast, north, and northwest. The overall structure is interrupted by several subordinate folds which bring the bentonite beds to the surface repeatedly, so that large resources of bentonite are present under light overburden. The results of drilling-mud and foundry-sand bonding-clay tests of several hundred samples, as well as analyses of selected samples, chiefly by X-ray, differential thermal, base exchange and spectrographic methods, are included in this report.

Order from GPO $2.50 as
I 19.16:335

Geological Survey, Washington, D. C.
CHARACTERISTIC LOWER CRETACEOUS MEGAFOSSILS FROM NORTHERN ALASKA, by Ralph W. Imlay. 1961, 100p. 92 refs. Geological Survey Professional Paper 335.

DESCRIPTORS: *Paleoecology, Geology, Rock, *Alaska, Mollusca, Worms, Gastropods, Echinoderms, Aquatic animals.

The megafossils from the Lower Cretaceous rocks of northern Alaska prove that only the Berriasian, Valanginian, and Albian stages are represented by strata. The lower Berriasian coincides with an erosional unconformity that locally truncates rocks of Jurassic, Triassic, and late Paleozoic age and that the Hauterivian, Barremian, and Aptian stages coincide with an angular unconformity involving mountain building, overthrusting, and considerable erosion. They date the Okpikruak formation as being of Berriasian and Valanginian ages and show that the earliest Cretaceous sea advanced over a hilly terrane, of which some high spots were not covered until the middle Valanginian. They date the Fortress Mountain formation, the Torok formation, and the overlying formations to the base of the Cenomanian Ninuluk formation as of Albian age only. The abrupt termination of the megafossil species at the top of the Albian strata indicates that some major geologic event occurred at the end of Albian time, either in Alaska or in the Boreal region.

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Geological Survey, Washington, D. C.
FOSSIL ALGAE FROM ENIWETOK, FUNAFUTI AND KITA-DAITO-JIMA. BIKINI AND NEARBY ATOLLS, MARSHALL ISLANDS, by J. Harlan Johnson. 1961, 59p. 40 refs. Geological Survey Professional Paper 260-Z.

DESCRIPTORS: *Algae, *Paleoecology, *Pacific Islands, *Bikini, Atoll, Geology, Rock, Geological time, Determination.

Ninety species belonging to sixteen genera of calcareous algae are described and discussed. Four of the species are new. Most of the algae were obtained from holes drilled on Eniwetok, Funafuti, and Kita-Daito-Jima; a few from outcrop samples. The several habitats occupied by algae on the existing reefs are breifly described. Algae are shown to have value as paleoecological indicators. They have contributed notably as rock builders. The rocks containing the algae have been dated as: Recent and Pleistocene (?), Miocene, and Eocene. The algal floras from these units are quite distinct. Many of the species observed growing on the existing reefs occur in the Pleistocene (?) limestones along with some additional forms. With the exception of the highly variable form designated as Lithoporella melobesioides (Foslie) Foslie, the Recent-Pleistocene (?), Miocene, and Eocene floras have no species in common. Charts show the known geographic and geologic distribution of species. Details of the stratigraphic distribution of the algae in the drill holes are appended at the end of the report. (Author)

Order from GPO $5.00 as
I 19.16:338

Geological Survey, Washington, D. C.
GEOLOGY AND ORE DEPOSITS OF EAST SHASTA COPPER-ZINC DISTRICT SHASTA COUNTY, CALIFORNIA, by John P. Albers and Jacques F. Robertson. 1961, 131p. 82 refs. (In cooperation with the State of California, Department of Natural Resources, Division of Mines.) Geological Survey Professional Paper 338.

DESCRIPTORS: *Geology, Ores, *Deposits. *California, *Copper, *Zinc, Geophysical prospecting, Mining engineering, Geological survey.

The area described in this report includes about 90 square miles in west-central Shasta County, Calif. It lies in the southern Klamath Mountains and includes the eastern part of what has long been known as the eastern part of the Shasta copper belt. Inasmuch as sulfide deposits in the eastern part of the Shasta copper belt contain at least as much zinc as copper the area is here called the East Shasta copper-zinc district. The area mapped measures about 17 miles in an eastwest direction by 5 miles in a north-south direction and includes parts of the Lamoine, Bollibokka Mountain, and Millville 15-minute quadrangles. The area mapped is bounded on the west by long 122°22 1/2' W, and on the south by lat 40°45' N., although the extreme southeastern part extends about 3 miles south of that parallel. (Author)

Order from GPO $1.50 as
I 19.16:349-A

Geological Survey, Washington, D. C.
GEOLOGY OF THE RICHARDSON COVE AND JONES COVE QUADRANGLES, TENNESSEE. GEOLOGY OF THE GREAT SMOKEY MOUNTAINS, TENNESSEE AND NORTH CAROLINA, by Warren Hamilton. 1961, 55p. 37 refs. Geological Survey Professional Paper 349-A.

DESCRIPTORS: *Geology, *Tennessee, North Carolina, *Rock.

The indurated rocks are of Precambrian, Cambrian, and Ordovician age and are all of sedimentary origin. The rocks form four widely different groups, separated by reverse faults, each with miles of displacement. The Snowbird group of the late Precambrian Ocoee series underlies the southern foothills, and is an assemblage, perhaps 20,000 feet thick, dominated by a great mass of metasiltstone. The Walden Creek group perhaps 8,000 feet thick, of the Ocoee series underlies the northern foothills, and is an assemblage of shale and sandstone with some limestone. Lying tectonically between the Ocoee series and Ordovician rocks are the quartzite and sandstone of the Cochran formation of the Chilhowee group, about 1,000 feet thick, of Cambrian and Cambrian (?) age. The exposed Ordovician rocks consist of 2,000 feet of limestone and dolomite, overlain by about 2,000 feet of calcareous shale and sandstone.

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I 19.3:1028-S

Geological Survey, Washington, D. C.
GEOLOGY OF UNALASKA ISLAND AND ADJACENT INSULAR SHELF, ALEUTIAN ISLANDS, ALASKA. INVESTIGATIONS OF ALASKAN VOLCANOES, by Harald Drewes, G. D. Fraser and others. 1961, 93p. 66 refs. Geological Survey bulletin 1028-S.

DESCRIPTORS: *Rock, *Volcanoes, *Geological survey, *Alaska, Aleutian Islands, Arctic regions.

The oldest rocks on the island, the Unalaska formation, consist of altered andesitic intrusive and extrusive rocks, and sedimentary rocks derived from similar igneous rocks. Conglomerates and coarse breccias are the dominant sedimentary rocks in the northern and eastern part of the island; finer epiclastic and pyroclastic rocks, particularly argillite, are dominant in the south. Fragments of a desmostylid, distant relative of the modern sea cow, date some of the formation as early Miocene. The coarse facies is probably a nearshore marine deposit; the finer facies suggest deposition in deeper basins. Conspicuous, bulbous igneous masses whose diameters range from a few feet to several hundred feet were intruded into and possibly extruded upon muds and are associated with pillow lavas.

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Geological Survey, Washington, D. C.
JURASSIC (BATHONIAN OR EARLY CALLOVIAN) AMMONITES FROM ALASKA AND MONTANA. SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY by Ralph W. Imlay. 1962, 40p. 52 refs. Geological Survey Professional Paper 374-C.

DESCRIPTORS: *Rock, Geological time, *Alaska, *Montana, *Geology, Geological survey, Paleoecology.

Jurassic ammonites of possible late Middle Jurassic (Bathonian) age occur in western Montana in the upper member of the Sawtooth formation and in the Cook Inlet area, Alaska, in the middle part of the Bowser member of the Tuxedni formation. They are characterized by Cranocephalites, a subgenus of Arctocephalites. They include, also, Holcophylloceras, Parareineckeia, a new genus of the Reineckeiidae, Cobbanites, a new genus of the Perisphinctidae, and some specimens assigned questionably to Oecotraustes, Xenocephalites, Arcticoceras, Siemiradzkia, and Arctocephalites.

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I 19.16:374-D

Geological Survey, Washington, D. C.
LATE JURASSIC AMMONITES FROM THE WESTERN SIERRA NEVADA, CALIFORNIA. SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, by Ralph W. Imlay. 1961, 36p. 67 refs. Geological Survey Professional Paper 374-D.

DESCRIPTORS: *Rock, Geological time, *Geology, *California, Geological survey, Paleoecology.

The ammonites from the Jurassic strata in the western part of the Sierra Nevada represent the Callovian, Oxfordian, and the lower part of the Kimmeridgian stages of the Upper Jurassic. The affinities of the Callovian ammonites in the Sierra Nevada are mainly boreal as indicated by the presence of such ammonites as Cadoceras, Paracadoceras; Pseudocadoceras, Kepplerites, and Gowericeras. The affinities of the late Oxfordian ammonites are mostly with ammonites in Mexico and Cuba but partly with those in Alaska. The early Kimmeridgian ammonite Amoeboceras indicates boreal affinities as the genus is rare in the Tethyan region.

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I 19.3:1110-A

Geological Survey, Washington, D. C.
LEAD-ZINC DEPOSITS OF THE BOQUIRA DISTRICT STATE OF BAHIA, BRAZIL. CONTRIBUTIONS TO BRAZILIAN GEOLOGY. NONFERROUS METALS, by Robert F. Johnson. 1962. 33p. 21 refs. Geological Survey bulletin 1110-A.

DESCRIPTORS: *Geology, Geological survey, *Brazil, *Lead, *Zinc, *Deposits, Ores, Minerals, Metals.

The Boquira lead deposit in south-central Bahia, discovered in 1952, is one of the largest in Brazil. The ore bodies occur as veins in lenses of iron-rich metasedimentary rocks on the east flank of the Serra de Macaubas. West of the crest of the serra is an extremely thick stratigraphic section of quartzite with minor units of interbeded quartz-mica schist. The section is at least 11,000 meters thick with no apparent repetition. Quartzite is also the dominant metasedimentary rock on the east side of the Serra de Macaubas, but there it contains interbedded lenses of dacite, quartz-biotite-garnet schist, iron formation, and dolomite; the lenses are as much as 200 meters thick. The layered rocks are late Precambrian. Granodiorite with a gneissic texture, dacite, and basic igneous rocks, now amphibolite, intrude the metasedimentary rocks. The bedded rocks west of the crest of the Serra de Macaubas dip westward, those east of the serra dip eastward, The beds on oposite sides of the serra cannot be correlated; those on the east side are older and faulted against those on the west along a reverse fault whose trace lies east of the crest of the serra. The rocks are also cut by northeast-and northwest-striking faults. Galena, the dominant sulfide mineral in the ore, occurs with sphalerite and pyrite in a gangue of actinolite and quartz. Supergene lead minerals are cerussite, pyromorphite, and possibly anglesite. The supergene zinc carbonate smithsonite occurs with galena but is absent in near-surface ore. (Author)

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I 19.3:1099-A

Geological Survey, Washington, D. C.
URANIUM-BEARING COAL IN THE CENTRAL PART OF THE GREAT DIVIDE BASIN. URANIUM-BEARING COAL IN THE GREAT DIVIDE BASIN, SWEETWATER COUNTY, WYOMING, by George N. Pipiringos. 1961, 104p. 37 refs. Geological Survey bulletin 1099-A.

DESCRIPTORS: *Uranium, Sources, *Coal, *Wyoming, Geology.

Thirty coal beds were mapped but only seven of them have uranium-bearing coal reserves. Coal beds 2.5 feet or more thick are considered in calculating coal reserves and, of these, only beds containing 0.003% or more uranium are considered in calculating the uranium content of coal. The uranium content of coal ash was estimated for those beds 2.5 feet or more thick that contain 0.015 % or more uranium in coal ash. Measured and indicated coal reserves in the area total about 730 million short tons and contain about 2,700 short tons of uranium in the coal, or about 2,500 short tons of uranium in the coal ash. Strippable coal (in beds beneath 60 feet or less of overburden) include about 250 million short tons of coal containing about 1,100 short tons of uranium in coal, or about 650 tons of uranium in coal ash.

TID-15116 $4.60

Kansas U., Lawrence.
THERMOLUMINESCENCE AND THE GEOCHEMISTRY OF CALCIUM CARBONATE IN RELATION TO RADIOACTIVE IMPURITY CONTENT. Technical progress rept., 1 Apr 61-1 Mar 62, on Contract AT(11-1)-1057. 46p.

Mineralogy

Order from GPO $4.00 as
I 19.16:353

Geological Survey, Washington, D. C.
BERYL RESOURCES OF NEW HAMPSHIRE, by James J. Page and David M. Larrabee. 1962, 65p. 34 refs. (In cooperation with the New Hampshire State Planning and Development Commission. Geological Survey Professional Paper 353.

DESCRIPTORS: *Beryl, Pegmatites, Minerals, Sources, Mines, *New Hampshire.

More than 200 pegmatites were examined either in reconnaissance fashion or in detail, and the most important actual or potential sources of beryl were carefully studied. These included the Palermo No. 1, Beryl Mountain, Blake, Chickering, Smith, No. 1, Corson, McGall, Chandler, Millard Chandler, Welch, and Parker Mountain mines, and the Vatcher, Hurley, and Smith No. 3 prospects. The pegmatites of the

Raymond district received special attention. These resources are of no great magnitude, but resources of milling-grade feldspar are of interest. The Palermo No. 1 and Beryl Mountain pegmatites were restudied. The relation of beryl to other minerals of the zones, the BeO content of the beryl, where determined, and the grade of the ore are indicated. The total estimated resources of beryl in New Hampshire are 1,780 tons, of which about 1,200 tons are probably in crystals at least 1 inch in diameter, and therefore hand-cobbable at 1957 prices. Most of this beryl is so scattered throughout the pegmatites that it represents less than 0.10 percent of the containing rock, and it is recoverable only as a byproduct from feldspar and mica mining activities. Large deposits containing fine-grained, nearly indistinguishable white beryl are unkown in the State, but there has been little attempt to search for them. (Author)

Order from GPO $0.30 as
I 19.3:1107-B

Geological Survey, Washington, D. C.
HEAVY MINERALS AS GUIDES TO URANIUM-VANADIUM ORE DEPOSITS IN THE SLICK ROCK DISTRICT, COLORADO. CONTRIBUTIONS TO THE GEOLOGY OF URANIUM, by Howard E. Bowers and Daniel R. Shawe. 1961, 59p. 11 refs. Geological Survey bulletin 1107-B.

DESCRIPTORS: Minerals, *Uranium, *Vanadium, *Ores, Deposits, Geology, Geophysical prospecting, *Colorado.

Heavy mineral studies were made of sandstone from the Morrison formation of Late Jurassic age in the Disappointment Valley area, Slick Rock district, San Miguel County, Colo. Among the heavy minerals recognized are black opaque minerals (which are now principally hematite), zircon, tourmaline, apatite, rutile, garnet, leucoxene, barite, anatase, pyrite, and galena.

Order from GPO $0.55 as
I 19.13:1616

Geological Survey, Washington, D. C.
ION-EXCHANGE MINERALS AND DISPOSAL OF RADIOACTIVE WASTES. A SURVEY OF LITERATURE, by B. P. Robinson, 1962, 132p. 1520 refs. Geological Survey Water-Supply paper 1616.

DESCRIPTORS: *Ion exchange, *Minerals, *Clays, Colloids, Adsorption, Thermodynamics, Reaction kinetics, Chemical equilibrium, *Radioactive waste disposal, Bibliography.

A review of the literature on ion-exchange theory, naturally occuring ion-exchange minerals, and the role of ion exchange in the disposal of radioactive wastes is presented. Ion exchange theory is discussed in terms of colloid science, thermodynamics, reaction kinetics, reaction mechanisms, and adsorption equations.

Order from GPO $0.65 as
I 19.16:384-A

Geological Survey, Washington, D. C.
THE SERPENTINE-GROUP MINERALS. STUDIES OF THE NATURAL PHASES IN THE SYSTEM MgO-SiO_2-H_2O AND THE SYSTEMS CONTAINING THE CONGENERS OF MAGNESIUM, by George T. Faust and Joseph J. Fahey. 1962, 92p. 241 refs. Geological Survey Professional Paper 384-A.

DESCRIPTORS: *Minerals, *Magnesium compounds, *Silicates, Oxides, Water, Magnesium, Physical properties, Chemical properties, Geochemistry, Optics, Crystal structure, X-ray diffraction analysis, Phase studies.

Twenty-eight chemically analyzed specimens (for 19 of which the analyses have not been published previously) and many unanalyzed specimens of serpentine-groups minerals were studied by various techniques, including chemical, optical, static dehydration, and differential-thermal-analysis (DTA), and X-ray powder diffraction methods. The various data were correlated and used to interpret the mineralogy of the serpentine group. The calculation of the chemical analyses of selected and carefully purified members of the serpentine group to the structural formula $X_6Y_4O_{10}(OH)_8$ reveals the closeness of the agreement between the analyses and the structural formula. X ranges from 6.04 to 5.81, and Y ranges from 4.00 to 4.09. A compilation of 219 analyses from the literature is given. The chemical uniqueness of antigorite in the serpentine group is affirmed. An examination of the data shows that with one exception all the specimens that show a deficiency of 0.19 to 0.16 ion in octahedral coordination are antigorites. This compositional difference sets apart the antigorites from the chrysotiles and lizardite. According to the paragenetic and the spectrographic data and the geochemical and petrological data from the literature, the geochemistry of the serpentine group minerals is related to their mode of origin and to the genesis of ultrabasic rocks. (Author)

Oceanography

Order from GPO $3.00 as
C 4.2:0c2

Coast and Geodetic Survey, Washington, D. C.
OCEANOGRAPHIC CRUISE REPORT, USC AND GS SHIP EXPLORER, 1960. SEATTLE, WASHINGTON, TO NORFOLK, VIRGINIA, 2 FEBRUARY - 27 APRIL 1960, by Harris B. Stewart, Jr. 1962, 162p. 5 refs.

DESCRIPTORS: *Oceanographic vessels, *Oceanographical data, *Hydrographic surveying, Ocean currents, Ocean bottom, Rock, Sedimentation, Aquatic animals, Caribbean Islands, Tides, Geology, Plants, Insects, Reptiles.

This report contains the field data obtained during the February to April 1960 oceanographic expedition of the USC&GS ship Explorer, together with such results from the analyses of these data as are completed to date.

PB 159 965 $3.60

[Coordinated Science] Lab., U. of Illinois, Urbana.
SEA CLUTTER SPECTRUM STUDIES USING AIRBORNE COHERENT RADAR III, by B. L. Hicks, N. Knable, and others. Rept. on Contract DA 36-039-sc-56695. May 58, 33p. 9 refs. Rept. R-105. AD-162 662.

DESCRIPTORS: *Sea water, *Water waves, *Wind, Measurement, Airborne, X-band, Radar equipment, Frequency, Spectrographic analysis, Meteorology, Probability.

Sea clutter was observed off the coast of New England with an airborne, coherent, X-band radar. Sea state data was derived from hindcasts and local observations to provide a characterization of the sea surface responsible for the clutter. Frequency B-scope displays and power spectra of the clutter were calculated from the observational data. The B-scope displays indicate again, as in earlier measurements made off the coast of Florida, that the upwind edge of the clutter spectrum is smooth for all wind speeds observed but that the downwind edge, for sea state 3 or above, is broadened in an irregular fashion as a function of range. This irregular broadening implies a considerable variability, from patch to patch, in the downwind side of the probability distribution of velocity of scatterers on the sea surface. (Author)

Order from GPO $0.35 as
I 19.16:354-H

Geological Survey, Washington, D. C.
FORAMINIFERA FROM ONOTOA ATOLL, GILBERT ISLANDS. SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, by Ruth Todd. 1961, 21p. 12 refs. Geological Survey Professional Paper 354-H.

DESCRIPTORS: *Foraminifera, Geology, Aquatic animals, Protozoa, Ecology, Beaches, Marine biology, Pacific Ocean.

The distribution of 168 species and varieties of smaller Foraminifera is recorded within the lagoon and on the reefs and beaches of Onotoa Atoll as represented by 33 surface samples and 23 pit samples. Four species--Calcarina spengleri, Baculogypsina sphaerulata, Amphistegina madagascariensis, and Marginopora vertebralis--make up quantitatively most of the foraminiferal material in the reef sediments. Major foraminiferal constituents of the lagoon sediments. Major foraminiferal constituents of the lagoon sediments are, in quantitative order: Amphistegina madagascariensis, Heterostegina suborbicularis, Marginopora vertebralis, and Elphidium striato-punctatum.

Order from GPO $0.60 as
I 19.16:412

Geological Survey, Washington, D. C.
SALINITY AND HYDROLOGY OF CLOSED LAKES, by Walter B. Langbein. 1961, 20p. 46 refs. Geological Survey Professional Paper 412.

DESCRIPTORS: *Lakes, Salinity, Hydrology, Climatic factors.

The salinity of closed lakes is highly variable, ranging from less than 1% to over 25% by weight of salts. Some evidence suggests that the tonnage of salts in a lake solution is substantially less than the total input of salts into the lake over the period of existence of the closed lake. This evidence suggests further that the salts in a lake solution represent a kind of long-term balance between factors of gain and loss of salts from the solution.

Physics of the Atmosphere

PB 151 399-13 $1.50

Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
MEAN ELECTRON DENSITY VARIATIONS OF THE QUIET IONOSPHERE NO. 13, SUMMARY OF ONE YEAR OF DATA, MAY 1959-APRIL 1960, by J. W. Wright. Rept. on Contract NTF-84. 15 Apr 62, 56p. 8 refs. Technical note no. 40-13.

DESCRIPTORS: *Ionosphere, Analysis, *Electrons, Density, Determination, Atmospheric sounding

The CRPL has initiated a program for large-scale computation of electron density profiles from ionospheric vertical soundings. Scaling is performed at field stations, permitting computation of hourly profiles at the Central Laboratory. These profiles are combined to form hourly mean quiet profiles for each station and month. This report is the last of a series which has illustrated the electron density variations in the mean quiet ionosphere between latitudes 15°N and 50°N along the 75°W meridian. It contains a summary of phenomena evident in the individual reports of the series, and a summary presentation of the year's data. (Author)

NASA N62-10747 $7.60

Ionosphere Research Lab., Pennsylvania State U., University Park
FEASIBILITY STUDY OF A SEPARATING CAPSULE ROCKET EXPERIMENT FOR THE ACCURATE DETERMINATION OF ABSOLUTE ELECTRON DENSITIES TO A HEIGHT OF SEVERAL THOUSAND KILOMETERS, by J. S. Nisbet, T. P. Quinn, and B. H. Carson. 1 Nov 61. 75p. 17 refs.
Scientific Rept.-152; NASA Grant NsG-134-61.

ANL-6531 $0.50

Argonne National Lab., Ill.
THE DESIGN AND CONSTRUCTION OF THERMAL FLOWMETERS, by R. W. Kessie. Rept. on Contract W-31-109-eng-38. Mar 62, 12p. 3 refs.

PB 181 300 $0.50

Bureau of Ships, Washington, D. C.
SHOP PRACTICE SUGGESTIONS [NO. 5] May 62, 33p.

DESCRIPTORS: *Ships, Maintenance, *Machine shop practice, Flight decks, Nozzles, Clamps, Security classification, Rods, Heaters, Lifeboats, Platinum, Cutting tools, Hoses, Furniture, Pumps, Switches, Coils, Submarines, Pipes, Catapults, Arresting gear, Elevators, Boilers, Horizontal indicators, Welding, Photographic plates, Sheets, Propellers, Shipping, Jigs, Cables, Thrust, Markers, Flames, Studs, Potentiometers, Armatures, Tools, Generators, Ship bulkheads, Binders, Gaskets, Dies, Hoists, Electrical equipment, Machining

Suggestions included are: Flight deck waterway covers; nozzle for flight deck sealer; horizontal honing improved; brackets for battle lanterns; portable grip hand clamp holder; identifying classified transparencies; removing sag from boring bars; nitrogen heater; handling of CO_2 lifeboats; platinum on slainity indicators; hole saw for glass-wool insulation; fire hose racks; furniture corners; repairing I. M. O. pumps; switch replacement; resistor coils; submarine shaft stiffeners; reclaiming damaged piping; lifting catapult track covers; hydraulic pump separator limiter; submarine tiller connecting keyways; arresting gear sockets; guards for elevator door fittings; boiler handhole plug refacing jig; foundation leveling device; multimeter bearings; hydraulic piping systems; adapter for stud welding gun; metalphoto plates; cleaning H. P. air piping; collar plates - improved method; catapult deadload surfaces; propeller shaft runout readings; torque washers for shipping crates; magnetic base drill jig; catapult cover turning tool; cable tensioning device; positioning alinement transits; HP turbine thrust collar; identifying valve label plates; cable marker punch; cutting tool tip inserts; installing multipin connectors; cable entrance improvements; flame safety lamp container; manhole cover studs; electrical cable trunks; boiler lifting gear; potentiometers; pallet for armatures; grounding multipin connectors; toolholder for turret lathe; handling submarine sections; cylinder clamp; solid jump leads for motor-generators; cutting boiler insulation; main circulating piping flanges; wireway collars in bulkheads; static dilution apparatus; plastisoled metal binder; boring bar holder; forming tool; LST bow ramp gasket; grinding die chasers; boiler tube polisher; hot water tank coil connection; magazine hoist rails; repairing flight deck leaks; machining sectional sea chest sleeves; grounding electrical equipment on plastic fairwaters. (See also PB 181 045)

Order from GPO $0.65 as D 103.6/3:1110-345-290

Engineer Corps. Washington, D. C.
GENERAL PROVISIONS AND GEOMETRIC DESIGN FOR ROADS, STREETS, WALKS, AND OPEN STORAGE AREAS. Engineering and Design Manual. 21 July 61, 64p. 28 refs. EM 1110-345-290.

DESCRIPTORS: *Civil engineering, Engineering, Engineering personnel, Personnel, *Instruction manuals, Military facilities, Roads, Storage, Design.

General provisions and geometric design criteria for guidance of Corps of Engineers personnel responsible for design of roads, streets, walks, and open storage areas at military installations are presented.

Order from GPO $0.75 as D 103.6/3:1110-2-4000

Engineer Corps, Washington, D. C.
RESERVOIR SEDIMENTATION INVESTIGATIONS PROGRAM. Engineering and Design Manual. 15 Nov 61, 40p. 9 refs. EM 1110-2-4000.

DESCRIPTORS: *Sanitary engineering, Engineering personnel, Personnel, *Instruction manuals, Water supplies, *Hydraulic reservoirs, *Sedimentation.

This manual provides information and instructions for use in planning and conducting programs for reservoir sedimentation investigations. Engineering applications are presented to provide a basis for a review of existing and probable future needs for reservoir sedimentation data and for the conduct of sediment investigations. Topics discussed include: (1) basic objectives, terminology, and field facilities; (2) reservoir sedimentation surveys and (3) formulation of program plans.

SC-4673(RR) $0.75

Sandia Corp., Albuquerque, N. Mex.
A NEW APPROACH TO CLEANROOM DESIGN, by W. J. Whitfield. Mar 62, 24p.

Aeronautical Engineering

PB 181 306 $1.25

Applied Psychology Corp., Arlington, Va.
AIRCRAFT FLIGHT-ATTITUDE INFORMATION AS INDICATED BY EXTERIOR PAINT PATTERNS. Technical rept. no. 3 on Contract FAA/BRD-127. June 61, 42p.

DESCRIPTORS: *Aircraft markings, *Paints, Colors, Detection, Pilots, *Coding, Vision, *Aviation accidents, *Aviation safety, *Navigational lights, Visual perception, *Lighting systems, Mathematical analysis, Visual thresholds, Interception, Interception probabilities

Five experiments were conducted to find what effect aircraft paint patterns have on pilots' ability to identify aircraft attitudes. The major finding of the five studies is that paint patterns do not greatly affect pilot judgments of aircraft attitude in a similated situation. It was concluded that background and lighting conditions had no statistically significant effect on accuracy of attitude determination.

PB 181 305 $1.50

Applied Psychology Corp., Arlington, Va.
COMPARATIVE CONSPICUITY OF SEVERAL AIRCRAFT EXTERIOR PAINT PATTERNS. Technical rept. no. 2 on Contract FAA/BRD-127. June 61, 52p. 4 refs.

DESCRIPTORS: *Aircraft markings, *Paints, Colors, Brightness, Surfaces, Analysis, *Coding, Vision, *Aviation accidents, *Aviation safety, Navigational lights, Visual perception, *Lighting systems, Mathematical analysis, Visual thresholds, Interception, Interception probabilities

Five experiments were conducted to determine the relative conspicuity of a variety of aircraft exterior paint patterns. The experiments yielded evidence that: (a) the amount of fluorescent paint coverage correlates positively with conspicuity; (b) more beneficial results are obtained when high-reflectance paints are placed on the upper surfaces of the aircraft and low-reflectance paints on the underside; (c) maximizing brightness contrasts among portions of the aircraft's surfaces does not lead to enhanced conspicuity; (d) flight attitudes, backgrounds, lighting conditions, and subjects did not affect conspicuity scores greatly, thus illustrating the problem that paint patterns, when evaluated against the wide range of conditions encountered in actual flight, lose value as conspicuity aids.

PB 181 307 $1.50

Applied Psychology Corp., Arlington, Va.
FIELD STUDY OF THRESHOLD RANGES FOR AIRCRAFT DETECTION AND COLOR IDENTIFICATION. Technical rept. no. 4 on Contract FAA/BRD-127. June 61, 53p. 1 ref.

DESCRIPTORS: Visual thresholds, Aircraft, *Detection, Colors, *Coding, Vision, *Aviation accidents, *Aviation safety, *Navigational lights, Visual perception, *Lighting systems, Mathematical analysis, Interception, Interception probabilities

Over 500 operational aircraft were observed, in order to obtain a rough approximation of the range at which aircraft become visible and at which color on them can be identified. Data were collected so as to permit exhaustive examination of all the factors which might influence these ranges. Paints were found to have no effect on aircraft threshold ranges. There were found to be slight relationships with the following elements of the observation situation: cloud backgrounds, sun elevation, ground visibility, brightness contrast, and individual differences among observers. Relative ranges for various sun, aircraft, and observer positions were found to follow closely the rankings predicted by earlier investigators working with a theoretical model. Aircraft size and aspect were related to threshold range, but not as precisely as predicted. Within the somewhat limited range wherein colors can be identified, fluorescent colors were identified more than twice as far as non-fluorescent colors.

PB 159 979 $7.60

Applied Psychology Corp., Arlington, Va.
PILOT JUDGEMENTS OF SIMULATED COLLISIONS AND NEAR MISSES: A COMPARISON OF PERFORMANCE WITH UNCODED AND TWO-TONE CODED MODELS. Technical rept. no. 5 on Contract FAA/BRD-127. Apr 61, 80p. 4 refs.

DESCRIPTORS: *Aviation accidents, Accidents, Simulation, Coding, *Flight simulators, Flight testing, *Pilots, Tests, Visual perception, Perception, Training.

Thirty-six standardized flight simulator problems were constructed in which the simulator cockpit, rather than simulated gunfire from the cockpit, intercepted or missed target images. The ability of pilots to predict collisions and misses was measured. Judgments based on two-tone target models which differentiated left from right, top from bottom, or front from back were not significantly better than those based on an all-white target. Pilot-subjects reported heavy reliance on apparent relative motion of the target in making their judgments about the outcome of the simulated flight problems.

AD-273 691 repriced $2.00

Applied Psychology Corp., Arlington, Va.
THE ROLE OF PAINT IN MID-AIR COLLISION PREVENTION. Final rept. no. 1, on Contract FA/BRD-127. Dec 61, 71p. 46 refs.

DESCRIPTORS: *Aviation accidents, *Aviation safety, Visual perception, Aircraft, Surfaces, *Paints, Florescence, Vision, Economics, Detection, Visibility, Interception.

This report summarizes that portion of a research program on visual collision avoidance techniques which deals with the use of exterior surface treatments. Specifically, the aim of the research was to identify the human factors considerations and the related design requirements for a maximally effective paint pattern. Methods and results of laboratory studies, field observations, and flight tests designed or conducted in this program are summarized, and pertinent literature is reviewed. Economic considerations in applying and maintaining paint treatments are described.

NASA N62-10920 $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
SUBSONIC WIND-TUNNEL INVESTIGATION OF ERRORS INDICATED BY TOTAL-PRESSURE TUBES IN THE FLOW FIELD OF A BODY SIMULATING THE NOSE OF THE X-15 RESEARCH AIRPLANE, by William J. Alford, Jr. Apr 62, 23p. 2 refs. NASA-TN-D-1250.

AD-273 831 repriced $2.00

Motorola, Inc., Riverside, Calif.
DEVELOPMENT OF THE PILOT WARNING INSTRUMENT (PWI) by A. Farkas and G. D. Morehouse. Final engineering rept. May 60-Feb 61, on Contract FAA/BRD-248. Feb 62, 78p. Rept. no. RLF-3852-1.

DESCRIPTORS: Aviation accidents, Countermeasures, *Aviation safety, *Instrumentation, Transmitter receivers, Display systems, Discriminators, *Flight instruments, Design.

The theory and operation of a metric wave pilot warning instrument are presented in detail. Each aircraft transmits its altitude as frequency modulation at 135.54 megacycles. This interrogating pulse of 500 microseconds is transmitted omnidirectionally and reply is made by all coaltitude aircraft with a 15 microseconds pulse at 135.54 megacycles. The direction of the reply is determined by receiving the signal on three spaced antennas and comparing the phase. Crystal control is used for both transmitter and receiver stability. The distance and angle of arrival are presented on a multiple sector display. Range is presented in 5 mile segments to 25 miles and angle in 6, 30° segments for the forward 180°. Information content is adequate for the full 360° but was not included for reasons of economy. The several individual circuits and functions are discussed adequately for maintenance of the equipment during evaluation and test. Complete schematics and critical waveforms are included. Recommendations for improvement include increase of channel width to improve range resolution and further development of altitude transducers to improve accuracy. Also, the display utilized is not capable of presenting target range and bearing with accuracy derived by the Receiver-Transmitter.

PB 181 308 $2.25

National Aviation Facilities Experimental Center, Atlantic City, N. J.
A SIMULATION STUDY OF OPERATIONAL PROCEDURES FOR TURBOJET AIRCRAFT, by J. H. Eichenlaub, R. C. Conway and others. Final rept. Nov 61, 87p. Task no. 101-113T.

DESCRIPTORS: *Jet planes, Operation, *Civil aviation, *Air traffic control systems, Analysis, Simulation, New York, Airport radar systems, Landing fields, Configuration, Turbojet engines.

The simulation study revealed that, regardless of the configuration or the percentage of civil turbojets, the arrival rate and approach interval remained constant. Additionally, the segregation of jets and propeller-driven aircraft had little or no effect on system efficiency when striving for 4 miles' separation at touchdown. Terminal tests showed little statistical difference in metering civil turbojet aircraft to the final approach course from 15,000 to 20,000 feet. However, subjective controller opinion indicated that an altitude of 15,000 feet and a distance of 30 nautical miles were the most desirable. Tests indicated that the most adaptable configurations for feeding a final approach course include the Y and base-leg designs, when coupled with dual turbojet holding patterns. Results of the various configurations indicated that it was feasible to eliminate low-altitude holding for civil turbojet aircraft.

PB 159 977 $16.50

TRW Computers Co., Canoga Park, Calif.
AIR TRAFFIC CONTROL STUDIES, by A. S. Jackson, H. I. Ottoson and others. Rept. no. 10 (Final), 1 Jan 60-28 Feb 61, on Thermal Area Sequencing and Control (Project TASC), Contract FAA/BRD-112.

DESCRIPTORS: *Air traffic control systems, *Simulation, Control systems, Computers

The report covers (1) the philosophy and aims of real-time simulation in the terminal area, (2) equipment available for real-time simulation, (3) brief description of the systems that have been simulated, and results obtained from real-time simulation and theoretical studies.

Chemical Engineering

Order from GPO $0.30 as I 28.3:597

Bureau of Mines, Washington, D. C.
PILOT-PLANT STUDIES OF THE HOT-CARBONATE PROCESS FOR REMOVING CARBON DIOXIDE AND HYDROGEN SULFIDE, by J. H. Field, H. E. Benson and others. 1962, 44p. 21 refs. Bulletin 597.

DESCRIPTORS: *Gases, Purification, *Carbon dioxide, *Hydrogen compounds, *Sulfides, Separation, *Potassium compounds, *Carbonates, Temperature, Chemical reactions, Coal, Liquids, Fuels, Synthesis.

A purification process was developed for efficiently treating synthesis gas for producing synthetic liquid fuels by using a hot solution of potassium carbonate. Absorption takes place at elevated pressure at or near the atmospheric-boiling point of the solution, and the solution is regenerated by pressure letdown and steam stripping. Heat exchange between the absorption and

regeneration steps is eliminated, and the steam requirements for regeneration are appreciably lower than those of monoethanolamine systems. The initial work was done in a small pilot plant using inert gas containing carbon dioxide and nitrogen. Based on the favorable results of this study, a larger pilot plant was built and operated to approach more closely a commercial-size unit. The following process variables were studied in the pilot plant: Absorption pressure, regeneration pressure, carbon dioxide and hydrogen sulfide concentrations in the feed and scrubbed gases, solution carrying capacity, concentration of solution, packing size and volume, and gas and liquid throughput. The results show that hot-carbonate purification becomes economical with other systems at a carbon dioxide partial pressure of 20 to 30 p.s.i. in the feed gas. The economy increases at higher partial pressures as the solution carrying capacity is increased, and the steam consumption is decreased. Removal of hydrogen sulfide proceeds rapidly with hot-carbonate solution. Sufficient carbon dioxide must be removed in the absorption to replace that lost from the solution during regeneration by decomposition of bicarbonate. (Author)

PB 181 298 $2.75

Dow Chemical Co. [Freeport, Tex.]
SEAWATER SOFTENING BY ION EXCHANGE AS A SALINE WATER CONVERSION PRETREATMENT, by W. F. McIlhenny. Final rept. on Contract 14-01-001-205. May 62, 147p. 19 refs. Office of Saline Water Research and Development progress rept. no. 62.

DESCRIPTORS: *Sea water, *Desalination, *Ion exchange, Evaporators, Ion exchange resins, *Water softeners, Costs, Industrial equipment, Water supplies, Density, Chlorides, Water vapor, Vapors, Vaporization, Vapor pressure, *Distilling plants.

An experimental program to partially soften seawater by cation exchange as a feed to a seawater evaporator is reported. Data are reported on the method of softening, cycle times and flows, and softening efficiencies obtained. Cyclone operation and the effect of variables on softening efficiency were studied. A large scale cost estimate based on pilot plant data is included. Regereration waves are shown and the effect of variables discussed. Evaporator operation was studied in four phases: with no seawater softening or alkalinity control; with soft seawater and no alkalinity control; with soft seawater and with alkalinity control; and with a softened ground water from Roswell, N. Mex. The effect of operation on the physical characteristics of the ion exchange resins was studied. Equilibrium data for the seawater-resin system is shown, with a method of calculation for the ternary ion system.

PB 181 297 $1.50

Monsanto Research Corp., Everett, Mass.
INVESTIGATION AND PREPARATION OF POLYMER FILMS FOR SALINE WATER CONVERSION. Rept. on Contract 14-01-001-203. Apr 62, 57p. 6 refs. office of Saline Water Research and Development progress rept. no. 61.

DESCRIPTORS: *Sea water, Water, *Desalination, *Polymers, *Films, Preparation, Glycols, Additives, Lithium compounds, Perchlorates, Cresyl radicals, Phosphates, Cellulose acetates, Chemical reactions, Temperature, Permeability, Transmission.

The ultimate objective of this program is the utilization of polymeric films for the desalination of sea water. The rate of permeation by water is to be combined with high rejection of salts and high film durability in such a way that the cost of conversion will be economical.
The immediate objectives have been, first, the preparation of films having superior transmission characteristics and good durability and, second, the determination of the molecular features of polymeric film that, when controlled, will insure a prolonged high transmission rate of water and negligible transmission of salts.

Electrical and Electronic Engineering

PB 159 964 $2.60

Balco Research Labs., Newark, N. J.
A STUDY OF MINIATURE COMPOSITION RESISTORS FOR HIGH TEMPERATURE OPERATION, by Lewis Balamuth and M. U. Cohen. Quarterly rept. no. 4 for 15 July 47 on Contract W36-039-sc-32275. 10 Aug 47, 21p. ATI-209 540.

DESCRIPTORS: *Resistors, *Miniature electrical equipment, Temperature, Design, Construction, Tests

The design and fabrication of miniature resistors for high temperature operation are described. The resistance range of 10^5 to 10^6 ohms was given special attention. Work has been concentrated on internally coated, tubular designs. A new method of hermetic sealing, involving the use of silicone varnish is reported. (Author)

PB 159 962 $2.60

Columbia U. School of Engineering, New York.
AN APPLICATION OF FUNCTIONAL ANALYSIS TO THE OPTIMAL CONTROL PROBLEM, by G. M. Kranc and P. E. Sarachik. Technical rept. no. 72 on Contract AF 49(638)998. 22 Jan 62, 28p. 25 refs. Rept. no. CU-6-62-AF-998-EE; AFOSR-2102.

DESCRIPTORS: Linear systems, *Control systems, Synthesis, *Functional analysis, Inequalities.

The method is applied to obtain generalization of the previously published results to the case of a time optimal n^{th} order system with r inputs. (Author)

IDO-19301 $19.75

Combustion Engineering, Inc., Idaho Falls
SL-1 RECOVERY OPERATIONS. Rept. for 3 Jan-20 May 61, on Contract AT(10-1)-967. 30 June 61, declassified 6 Nov 61, 322p. CEND-1007.

PB 158 718 $13.00

IBM [Command Control Center] Federal Systems Div., Kingston, N. Y.
THIN-FILM CIRCUIT FUNCTIONS, by R. G. Counihan, H. J. Beatty and others. Final rept. 1 Aug 59-31 July 60, on Contract DA 36-039-sc-84547. [1960] 185p. 44 refs. AD-248 733.

DESCRIPTORS: *Electronic equipment, Silicon, *Electronic circuits, Military equipment, *Thin films, Manufacturing methods, Dielectric films, Semiconductors, Resistors, *Subminiature electronic equipment, Single crystals, Capacitors.

A resume of the initial program includes: preliminary circuit selections; passive component materials; substrate material, size, and cleaning procedures; and selection of chip-type active elements. Development of thermo-compression bonding for element and circuit interconnections, equipment used, and test results are described in detail. Several topological design rules for multilayering of vacuum-deposited thin films are presented. The vapor-growth process of epitaxially growing silicon on a single-crystalline silicon substrate by the silicon di-iodide disproportionating reaction is treated comprehensively. Analyses are made of: (a) problems in fabricating thin-film resistors and capacitors to close tolerances and in eliminating unwanted opens and shorts and (b) circuit performance and characteristics of the experimental models of thin-film circuits. Environmental data on thermal shock, temperature, moisture and mechanical shock and vibration are presented for encapsulated and unencapsulated samples. The continuing long-range investigation into the physics of thin-film components is described. This investigation includes conductors, resistors, dielectrics, inductors and transformers, and the epitaxial growth of semiconductor films by sputtering and vacuum evaporation. (Author) (See also PB 152 672)

HASL-119 $0.75

Health and Safety Lab., Atomic Energy Commission, New York.
PREPARATION OF ETCHED CIRCUITS FOR LABORATORY USE, by Frederick C. Wilson. Jan 62, 30p

AD-273 688 repriced $2.50

Inland Testing Labs., Dayton, Ohio.
ALKALINE BATTERY EVALUATION, by I. F. Luke, W. G. Ingling, and W. W. Clark. Semi-annual rept. no. 2, 30 June 60-15 Oct 61, on Contract AF 33(616) 7529. Jan 62, 112p. 5 refs. Rept. no. ASD-TDR-62-68, supersedes ASD Technical rept. 61-236, May 61.

DESCRIPTORS: *Alkaline cells, Wet cells, Storage batteries, Spaceships, Satellite vehicles, Anodes (Electrolytic cells), Cadmium compounds, Hydroxides, Cathodes (Electrolytic cells), Nickel compounds, Hydroxides, Battery separators, Cellulose, Electric insulation, Ethylenes, Fluorides, Polymers, Nylon, Electrolytes, Potassium compounds, Hydroxides, Containers, Stainless steel, Magnesium, Seals, Rubber seals, Valves, Check valves, Design, Tests, Failure (Mechanics), Analysis, Cadmium, Nickel, Silver, Zinc.

The report covers the first period of an alkaline battery applied research and failure analysis program to establish a broad base of battery test data for the design of electrical systems of future space vehicles. Another objective is to determine techniques and/or materials to prevent these failures while increasing the usable watt-hours-per-pound capability and cycle life of the battery. Cycle-life tests were conducted on 1 type of 12-amp-hr, sealed, Ni-Cd cell in 2 temperature environments and 4 depths of discharge. Initial results show that (1) cell cycle-life with shallow discharges is considerably longer than cycle-life at deep discharges, and (2) cycle-life is reduced by high ambient temperatures. The program will include as future work evaluation of Ag-Cd and Ag-Zn type cells. (Author)

NASA N62-10748 $7.60

Ionosphere Research Lab., Pennsylvania State U., University Park
PHASE DISTORTION IN HIGH FREQUENCY TRANSISTOR AMPLIFIERS, by T. A. Seliga. 1 Dec 61. 77 p. 31 refs. Scientific Rept. 153; NASA Grant NsG-134-61.

TID-11539 $1.60

Knolls Atomic Power Lab., Schenectady, N. Y.
REARRANGED PLANT 4160-VOLT SYSTEM SERVES NEW TEST FACILITY, by R. J. Huntemer. Mar 62, 14p.

AD-273 133 $2.00

Laboratory for Electronics, Inc., Boston, Mass.
EMS MINIATURIZATION STUDY, by Edward P. Farnsworth and Frank Marsden. Final rept. 5 July 61-5 Jan 62, on Contract AF 19(604)8841. [1962] 74p. LFE rept. no. C-907-A; AFCRL-62-54; NASA N62-10315.

DESCRIPTORS: Mobile, *Air force equipment, Electronic equipment, *Miniature electronic equipment, Subminiature electronic equipment, Design, Economics, Maintenance, Reliability, *Communication equipment, Satellite vehicles, Communication systems, *Telegraph transmitters, *Telegraph equipment, Printing, Meteorology, Recording systems, *Facsimile recording systems, *Facsimile receiver converters, *Air traffic control systems, *Radio communication systems, High frequency, Very high frequency, Ultra high frequency, Transmitter receivers, Air force communications, *Voice communication systems, *Microwave relay systems, Radio relay systems, Low frequency, *Radio beacons.

The purpose of the study program was to determine which items of equipment specified for the Augmented 4-Wheels System and required in the 1965-1975 EMS System can be further reduced in size by miniaturization or development effort, in order to provide a more compact, mobile, air transportable system in the

future. Included in this study are considerations of the economics of micro-miniaturization, over-all equipment size reduction achievable, maintenance and reliability problems, and effect on performance characteristics.

NASA N62-10799 $1.60

Minneapolis-Honeywell Regulator Co., Minn.
ADAPTIVE STATE VECTOR CONTROL. SECTION 2: MODES OF CONTROL, by C. A. Harvey. 15 Mar 62. 13p. 1 ref. MH MPG Report 1529-TR2; NASA Contract NASr-27.

NASA N62-10798 $2.60

Minneapolis-Honeywell Regulator Co., Minn.
ADAPTIVE STATE VECTOR CONTROL. SECTION 3: MEASUREMENT OF THE STATE VECTOR, by C. A. Harvey. 15 Mar 62. 22p. 3 refs. MH MPG Report 1529-TR3; NASA Contract NASr-27.

Order from GPO $0.40 as C 13.44:39

National Bureau of Standards, Washington, D. C.
CALIBRATION PROCEDURES FOR DIRECT-CURRENT RESISTANCE APPARATUS, by Paul P. B. Brooks. 1 Mar 62, 53p. NBS Monograph 39.

DESCRIPTORS: *Direct current, Resistance, *Resistors, *Electric bridges, Bridges, *Potentiometers, Calibration, Instrumentation.

The equipment and procedures used for the precise measurement of d-c resistance are explained in detail. The specific application of these procedures to the calibration of bridges and potentiometers is explained.

PB 161 640 $1.25

National Bureau of Standards, Boulder, Colo.
SITING CRITERIA FOR HF COMMUNICATION CENTERS, by William F. Utlaut. Apr 62, 46p. 22 refs. Technical note 139.

DESCRIPTORS: *High frequency, *Radio communication systems, Noise (Radio), Radio interference, Radio signal, Radio stations, Antenna radiation patterns.

A brief summary of ionospheric effects upon HF radio signals is presented. Various factors required for an ideal site such as Fresnel zone size and smoothness, noise, antenna height, vertical radiation angle and the electrical characteristics of the ground are discussed. Standards to guide compromises for practical cases of siting are considered. A partial bibliography which may be useful for those desiring a greater depth of understanding of the various subjects considered is provided. (Author)

PB 181 313 $0.50

Naval Research Lab., Washington, D. C.
AN INSTRUMENT FOR RESISTANCE MEASUREMENT OF SEMICONDUCTORS HAVING A LARGE SEEBECK COEFFICIENT, by P. E. V. Shannon and K. E. Glick. Final rept. 12 Apr 62, 13p. 5 refs. NRL rept. 5766.

DESCRIPTORS: *Semiconductors, Electrical properties, Measurement, *Electric bridges, Design, *Alternating current, *Resistance, Instrumentation

An alternating-current Kelvin bridge is described that measures resistance values in the milli-ohm range or less and which is free of error due to a Seebeck voltage resulting from Peltier heating. The capabilities of the instrument are: a range of resistance from 10^{-6} ohm to 1 ohm, an overall error no greater than 0.25%, and a reproducibility better than 99.9%. The instrument employs a measuring current frequency of 40 cps (which effectively eliminates Peltier heating) and incorporates variable and plug-in resistors to compensate for contact and lead resistance. Standard high-quality components were selected for use in the bridge, which was carefully constructed to have electrical symmetry and a minimum of inductance and distributed capacitance.

PB 181 314 $2.00

Office of Naval Research, Washington, D. C.
CONFERENCE ON NAVY LABORATORY MICRO-ELECTRONICS PROGRAM, HELD AT HOWARD COUNTY LABORATORY, APPLIED PHYSICS LABORATORY, THE JOHNS HOPKINS UNIVERSITY, ON JUNE 12 [AND] 13, 1961. [1961] 76p. 9 refs. ONR-11.

DESCRIPTORS: *Conferences, *Naval research, Naval research laboratories, *Subminiature electronic equipment, Miniature electronic equipment, Electronic equipment.

This volume contains the reports from representatives of the Navy laboratories on their programs and plans, reports on progress of conduct of work by Navy contractors, and a general discussion of the most salient parts of the program.

NASA N62-10879 $4.60

Purdue U., Lafayette, Ind.
TIME OPTIMAL DISCONTINUOUS CONTROL, by Rufus Oldenburger and Garth Thompson. [1960?] 37[13]p. 10 refs. NASA Grant NsG 28-59.

PB 157 195 $10.50

Radiation Engineering Lab., Maynard, Mass.
INVESTIGATION OF WIDE ANGLE SCANNING VHF ANTENNA ARRAYS. Final rept. on Contract AF 19(604)6191. 22 Jan 61, 138p. 13 refs. Rept. no. REL 123-45; AFCRL 330.

DESCRIPTORS: Very high frequency, Antennas, *Dipole antennas, Electronic scanners, Antenna radiation patterns, Design, Theory.

An investigation was conducted into the problems arising in the design of large V.H.F. scanning arrays capable of transmitting high power. Theoretical problems including suppression of grating lobes in broadside arrays as well as phase shift, attenuation and V.S.W.R. of periodic structures are discussed in detail. A fundamental limitation on suppression of secondary diffraction maxima in arrays with large element spacing is presented, and an analysis of Bandwidth of Resonant Arrays is included. Practical problems of most economical element, feeder, and phase shifting methods are discussed, and a relative cost analysis for different distribution and beam steering networks is presented. (Author)

NASA N62-10877 $4.60

Rensselaer Polytechnic Inst., Troy, N. Y.
ANALYSIS OF A PIECE-WISE LINEAR SYSTEM BY THE SOLUTIONS OF INTEGRAL EQUATIONS, by C. N. Shen and Hubert Wang. [1961?] 33[12]p. 4 refs. NASA Grant NsG 14-59.

TID-15158 $1.60

Sandia Corp., Albuquerque, N. Mex.
ENVIRONMENTAL TESTING OF RELAYS AT SANDIA CORPORATION, by R. W. Russell. Rept. on Contract AT(29-1)-789. 21 Feb 62, 15p.

PB 159 968 $1.10

Space Components, Inc., Washington, D. C.
SPRINGLESS POLARIZED RELAY. Interim Development rept. for 1 June-31 Aug 60, on Contract NObrs-81446. 25 May 60, 6p. 2 refs.

DESCRIPTORS: *Polarized relays, *Electric relays, Relays, Circuits, Springs.

PB 159 969 $1.10

Space Components, Inc., Washington, D. C.
SPRINGLESS POLARIZED RELAY. Interim development rept. for 1 Sep-30 Nov 60, on Contract NObsr-81446. 25 May 60, 9p.

DESCRIPTORS: *Polarized relays, Relays, Design, Ferrites, Magnetic properties, Circuits.

PB 159 970 $1.10

Space Components, Inc., Washington, D. C.
SPRINGLESS POLARIZED RELAY. Interim development rept. for 1 Dec 60-28 Feb 61, on Contract NObsr-81446. 25 May 60, 7p.

DESCRIPTORS: *Polarized relays, Relays, Design, Glass seals, Ferrites.

PB 159 963 $10.10

Stanford Electronics Labs., Stanford U., Calif.
A PRELIMINARY INVESTIGATION OF A HIGH-POWER HOLLOW-BEAM TWT AMPLIFIER, by M. I. Disman. Rept. on Contract DA 36-039 sc-73178 4 Nov 58, 130p. 20 refs. Technical rept. no. 458-1; AD-209 684.

DESCRIPTORS: *Traveling wave tubes, Amplifiers, *Electron beams, Design, Construction, Tests.

An attempt to demonstrate some of the advantages of using a hollow electron beam in a high-power traveling-wave-tube amplifier is described. A study of 3 different circuits, suitable for use with a hollow electron beam, was made. This investigation lead to the realization that the finned structure with an opposing conducting plane would have some interesting and desirable properties as a slow-wave circuit for a high-power TWT. The cylindrical form of the structure was then analysed in detail and some cold tests were made to verify the dispersion and impedance relations. On the basis of the theoretical and experimental results it was decided to build a megawatt-level TWT amplifier which used the disc-loaded coaxial-line structure. The tube was designed to operate at a beam voltage of 100 kv and a beam current of 60 amp in order to utilize an available pulser. The frequency of operation centered about 3 kmc and the tube was to have a net gain of 30 db with a 3-db bandwidth of at least 20%.

NASA N62-10885 $1.60

Stanford Research Inst., Menlo Park, Calif.
GENERALIZATION OF THE PHASE SHIFT INEQUALITY, by I. C. Percival (University Coll., London) Oct 60, 11p. NASA Contract NASw-80.

NASA N62-10865 $7.60

Stanford U., Calif.
AN INVESTIGATION OF THE EFFECTS OF THE TIME LAG DUE TO LONG TRANSMISSION DISTANCES UPON REMOTE CONTROL. PHASE II - VEHICLE EXPERIMENTS. PHASE III - CONCLUSIONS. Progress Rept. No. 3, by James L. Adams (Ph. D. thesis). Nov 61. 78p. 11 refs. NASA Grant NsG 111-61.

PB 160 005 $5.60

Westinghouse Electric Corp., Youngwood, Calif.
HIGH TEMPERATURE SWITCHING DEVICE [AND] CALCULATION OF CONCENTRATION PROFILES AND SURFACE CONCENTRATION FOR SHEET CONDUCTANCE MEASUREMENTS OF DIFFUSED LAYERS, by F. S. Stein and Michael F. Lamorte. Quarterly scientific rept. no. 6, 19 Aug-14 Nov 58, on Contract AF 33(600)35067. 14 Nov 58, 56p. 16 refs. AD-212 748.

DESCRIPTORS: *Switching circuits, *Transistors, *Crystal rectifiers, Design, Temperature, *Semiconductors, Surface properties, Diffusion, Conductivity, Sheets, Measurement, Mathematical analysis.

The geometrical configuration of the 20-amp trinistor was satisfactory. The quality of the silicon was found to play a major role in determining the success with which the trinistor may be fabricated. Diffusion data are summarized: the gallium is being maintained at 600°C to reduce surface concentrations. Several high-current trinistors were fabricated, whose characteristics are listed. (F. S. Stein) A method to obtain the sheet conductance profile or a diffused layer by ohmic contacts to the layer is suggested. Equations are presented from which the concentration profile may be obtained from sheet comductance measurements by either the four-probe or ohmic contact method. For three impurity concentration distributions, equations are presented for surface concentration which necessitate the measurements of sheet conductance, junction penetration, and the background conductivity. If the sheet conductance is much greater than the product of the background conductivity and the junction penetration, only the sheet conductance need be measured in order to determine the surface concentration. (M. F. Lamorte)

PB 159 957-5 $1.60

Wheeler Labs., Inc., Great Neck, N. Y.
ROTARY WAVEGUIDE JOINTS, by Henry Schwiebert. Interim progress rept. no. 5 (Rept. no. 1), 10 July 52-10 May 53, on Contract DA 36-039-sc-5575. [1953] 17p. 12 refs. WL rept. 587; AD-18 350.

DESCRIPTORS: Waveguides, *Waveguide joints, *Slip rings, Joints, Design.

PB 159 957-6 $1.60

Wheeler Labs., Inc., Great Neck, N. Y.
ROTARY WAVEGUIDE JOINTS, by Henry Schwiebert. Interim progress rept. no. 6 (Rept. no. 2) 11 May-10 Aug 53, on Contract DA 36-039-sc-5575. [1953] 18p. WL rept. 591; AD-22 864.

DESCRIPTORS: Waveguides, *Waveguide joints, *Slip rings, Design, Joints

Experimental work was conducted to determine the wide-band capabilities of several different methods of matching a coaxial line to 2 parallel-connected collinear rectangular wave guides such as are used in the ring of the complete rotary joint being developed. One type of structure employing a cone and a resonant series stub line showed promise of an excellent wide-band impedance match. Other work included the determination of the wide-band characteristics of the circular wave guide bends and transformers required in the ring to complete the transition. (Contractor's abstract)

PB 159 957-7 $1.60

Wheeler Labs., Inc., Great Neck, N. Y.
ROTARY WAVEGUIDE JOINTS, by Henry Schwiebert. Interim progress rept. no. 7 (Rept. no. 3) 11 Aug-10 Nov 53, on Contract DA 36-039-sc-5575. [1953] 14p. WL rept. 597; AD-26 663.

DESCRIPTORS: Waveguides, *Waveguide joints, *Slip rings, Design, Joints

The use of a cone and a resonant series stub line reduced the reflection in the portion of the transition from the coaxial line to the 2 parallel-connected rectangular wave guides to less than 0.2 db SWR over a 20% bandwidth. An inner radius of 1/2 in. was chosen for the wave-guide rings. Resonance may exist in the wave-guide ring when the path length around the ring is an odd multiple of $1/2\lambda$. A technique was devised for damping the resonant mode.

PB 159 957-8 $1.60

Wheeler Labs., Inc., Great Neck, N. Y.
ROTARY WAVEGUIDE JOINTS, by Henry Schwiebert. Interim progress rept. no. 8 (Rept. no. 4) 11 Nov 53-10 Feb 54, on Contract DA 36-039-sc-5575. [1954] 14p. WL rept. 608; AD-30 059.

DESCRIPTORS: Waveguides, *Waveguide joints, *Slip rings, Joints, Design

The reflection of the transition from standard rectangular wave guide to coaxial line has been reduced to within 0.3 db SWR over the 20% design bandwidth; the transformers intended for use in adapting this design to cover the upper and lower halves of each of the required 40% bandwidths have been designed; the calculations required to scale these designs to each of the specified wave guide sizes have been completed; the mechanical design work has been completed; and the drawings and construction of the final models have been started. (Extracted from report)

PB 159 957-9 $4.60

Wheeler Labs., Inc., Great Neck, N. Y.
ROTARY WAVEGUIDE JOINTS, by Henry Schwiebert. Technical rept. no. 9 (Final) 11 Feb-10 Oct 54, on Contract DA 36-039-sc-5575. [1954] 45p. 13 refs. WL rept. 621; AD-57 878.

DESCRIPTORS: Waveguides, *Waveguide joints, *Slip rings, Joints, Design.

A transition from rectangular waveguide to coaxial line was adapted for wideband applications and utilized in the design of rotary joint having characteristics of low reflection and high power capacity over a 20% bandwidth. Six rotary joints were scaled from this design, enabling the complete coverage of the rated 40% bandwidths of waveguide sizes RG-49/U, RG-51/U, and RG-52/U. The two transitions in each rotary joint were were designed to be independently matched and therefore may be located at any arbitrary spacing to suit the requirements of a particular application. The design model of the transition from rectangular waveguide to coaxial line is matched within 0.3 db SWR. Each completed model, which includes two transitions and two matching transformers, has a reflection within 1.2 db SWR (1.15 VSWR) over the 20% bandwidth. The power capacity of this rotary joint was optimized by the choice of a coaxial line having the highest power capacity consistent with single-mode propagation over the design bandwidth and by the design of the other internal contours to maintain this minimum power capacity throughout. (Author)

Ordnance, Missiles, and Satellite Vehicles

NASA N62-10680 $1.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
THE STABILIZATION OF AN ARTIFICIAL SATELLITE AT THE INFERIOR CONJUNCTION POINT OF THE EARTH-MOON SYSTEM, by G. Columbo. 1 Nov 61. 13p. 5 refs. SAO Special Rept. 80; NASA Grant NsG 87-60.

TID-15207 $1.60

Los Alamos Scientific Lab., N. Mex.
EXPERIMENTAL RESULTS FROM SOVIET SATELLITE FLIGHTS - A PRELIMINARY BIBLIOGRAPHY, by J. Arthur Freed. Rept. on Contract W-7405-eng-36. 1 Sep 61, 12p.

LAMS-2652 $1.25

Los Alamos Scientific Lab., N. Mex.
STUDIES ON THE POLYMORPHS OF HMX, by Howard H. Cady and Louis C. Smith. Rept. on Contract W-7405-eng-36. 3 May 62, 49p. 21 refs.

Order from GPO $0.45 as NAS 1.2:M31/961-2

Manned Spacecraft Center, National Aeronautics and Space Administration, Washington, D. C.
RESULTS OF THE SECOND U.S. MANNED SUBORBITAL SPACE FLIGHT, JULY 21, 1961, by Robert R. Gilruth. [1961] 58p. 15 refs.

DESCRIPTORS: *Space flight, *Satellite vehicles, *Astronauts, Physiology, Space medicine, Space environmental conditions, Satellite vehicle research, Manned, Orbital flight paths.

Contents:
Introduction, by Robert R. Gilruth, Director, NASA Manned Spacecraft Center
Spacecraft and flight plan for the Mercury-Redstone 4 flight, by Jerome B. Hammack, Mercury-Redstone Project Engineer, NASA Manned Spacecraft Center
Results of the MR-4 preflight and postflight medical examination conducted on astronaut Virgil I Grissom, by William K. Douglas, M. D., Astronaut Flight Surgeon, NASA Manned Spacecraft Center; Carmault B. Jackson, Jr., M. D., Life Systems Division, NASA Manned Spacecraft Center; Ashton Graybiel, M. D., USN School of Aviation Medicine, Pensacola, Fla.; George Ruff, M. D., University of Pennsylvania; Edward C. Knoblock, Ph. D., Walter Reed Army Medical Center; William S. Augerson, M. D., Life Systems Division, NASA Manned Spacecraft Center; and C. Patrick Laughlin, M. D., Life Systems Division, NASA Manned Spacecraft Center
Physiological responses of the astronaut in the MR-4 space flight, by C. Patrick Laughlin, M. D., Life Systems Division, NASA Manned Spacecraft Center; and William S. Augerson, M. D., Life Systems Division, NASA Manned Spacecraft Center; and William S. Augerson, M. D., Life Systems Division, NASA Manned Spacecraft Center
Flight surgeon's report for Mercury-Redstone missions 3 and 4, by William K. Douglas, M. D., Astronaut Flight Surgeon, NASA Manned Spacecraft Center
Results of inflight pilot performance studies for the MR-4 flight, by Robert B. Voas, Ph. D., Head, Training Office, NASA Manned Spacecraft Center; John J. Van Bockel, Training Office, NASA Manned Spacecraft Center; Raymond G. Zedekar, Training Office, NASA Manned Spacecraft Center; and Paul W. Backer, McDonnell Aircraft Corp.
Pilot's flight report, by Virgil I. Grissom, Astronaut, NASA Manned Spacecraft Center.

AD-274 322 repriced $0.75

Naval Ordnance Lab., White Oak, Md.
A LIGHTNING STRIKE OF AN UNDERWATER EXPLOSION PLUME, by George A. Young. 1 Feb 62, 26p. 7 refs. NOLTR 61-43.

DESCRIPTORS: *Underwater explosions, Explosions, *Lightning, Electrical effects, Electric fields, Photographic analysis, Meteorology, Electric discharges, *Explosion bubbles, Bubbles.

NASA N62-10768 $2.60

Radiation Applications, Inc., Long Island City, N. Y.
THE USE OF RADIATION-INDUCED PLASTIC MEMORY TO DEVELOP NEW SPACE ERECTABLE STRUCTURES. Quarterly Status Report, 3 Oct-29 Dec 61, by George Odian, Bruce S. Bernstein and others. [1962] 30p. 8 refs. Report RA1-300; NASA Contract NASr-78.

NASA N62-10767 $10.10

Rand Corp., Santa Monica, Calif.
COMMUNICATIONS SATELLITES AND TELEPHONE RATES: PROBLEMS OF GOVERNMENT REGULATION, by Leland L. Johnson. Oct 61. x, 115p. refs. MEMO. RM-2845-NASA; NASA Contract NASr-21.

NASA N62-10766 $3.60

Rand Corp., Santa Monica, Calif.
SATELLITE CHARGE-UP AS A MEANS OF MAINTAINING THE SHAPE OF ECHO-TYPE SATELLITES IN THE OUTER VAN ALLEN BELT, by R. O. Hundley. Dec 61. xiii, 21 p. 4 refs. MEMO. RM-2921-NASA; NASA Contract NASr-21.

NASA N62-10686 $1.60

Rensselaer Polytechnic Inst., Troy, N. Y.
SEMIANNUAL PROGRESS REPORT [TO THE] NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. Sep 61- 28 Feb 62. 27 Mar 62. 13 p. NASA Grant NsG-100-60.

PB 181 319 $0.50

Watertown Arsenal Labs., Mass.
FABRICATION AND UTILIZATION OF PLASTIC TOOLS AS MANUFACTURING AIDS, by Arthur M. Ayvazian and Charles R. Hyland. Mar 62, 16p. Technical rept. WAL TR 174.1/1.

DESCRIPTORS: *Plastics, Tools, *Machine tools, Production, Ordnance, Machining, Epoxy resins, Tests.

An investigation was conducted to develop more proficiency in the fabrication of plastic tooling as a manufacturing aid in the production of Ordnance components. A limited study of the cementing and reinforcing characteristics of epoxy resins is presented. Four current production machining applications were selected and techniques for fabricating plastic tools were developed. The plastic tooling applications were evaluated. (Author)

NASA N62-10899 $1.10

Wilmot Castle Co., Rochester, N. Y.
DRY HEAT STERILIZATION OF COMPONENTS FOR SPACE PROBES. Laboratory Progress Report No. 3; 1 Sep-30 Nov 61, by Carl W. Bruch. 1 Dec 61. 9p. NASA Contract NASr-31.

Sanitation and Safety Engineering

PNE-128P $0.50

Beers, Roland F., Inc., Alexandria, Va.
SUMMARY OF PREDICTIONS AND COMPARISON WITH OBSERVED EFFECTS OF GNOME ON PUBLIC SAFETY. Preliminary rept. on Plowshare Program, Project Gnome. 27 Apr 62, 15p. 25 refs.

LAMS-2660 $2.75

Los Alamos Scientific Lab., N. Mex.
PLUTONIUM FACILITY OPERATING PROCEDURES IN CMF-5, comp. by W. N. Miner and F. W. Schonfeld. Rept. on Contract W-7405-eng-36. 10 May 62, 174p.

PNE-129F $0.50

Sandia Corp., Albuquerque, N. Mex.
MONITORING VIBRATIONS AT U. S. BORAX AND CHEMICAL COMPANY POTASH REFINERY, by G. J. Hansen and R. G. Oliveria. Rept. on Plowshare Program, Project Gnome. 27 Apr 62, 22p. 25 refs.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

PB 181 192 $7.00

Bureau of Yards and Docks, Washington, D. C.
MACHINE SHOP MACHINE REPAIR FORMULAS. Engineered Performance Standards, Public Works Maintenance. July 57, rev. Oct 59, including changes of Oct 60 and Feb 62. 590p. NAVDOCKS P-707.1.

DESCRIPTORS: *Machine shop practice, *Machines, Cutting tools, Lathes, Milling machines, Drilling machines, Metal forming presses, Lawn mowers, Maintenance, *Instruction manuals.

Contents: power hacksaw; engine lathe; milling machine; drill press; arbor press; bolt threading machine; metal spraying; tools, sharpen; metal cutting band saw; pantograph engraving; grease and oil; adjust machine mechanisms; inspect and measure; lawnmower, sharpen and overhaul; clean parts and machine components; miscellaneous machine repair time values; dismantle or assemble machine components; check or test mechanisms; gaging; make machine gaskets.

CNLM-2370-3(Pt.I) $4.60

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
SPACE PROPULSION AND AUXILIARY POWER UNITS, A BIBLIOGRAPHY, by Elizabeth A. Cernak, comp. Rept. on Contract AT(11-1)-229. 2 Aug 60, 42p.

PB 181 317 $0.50

Rock Island Arsenal Lab., Ill.
COMPARATIVE MACHINING DATA OF CARBIDE, THROWAWAY CUTTING TOOLS, by J. J. Weintraut. 9 Jan 62, 16p. 4 refs. Rept. no. 62-137.

DESCRIPTORS: *Cutting tools, Titanium, *Carbide tools, Tools, Machining, Tests, Costs.

Turning tests were conducted with four commercial brands of titanium-carbide inserts and one commercial brand of tungsten-carbide insert. Annealed, FS 4140 alloy steel was machined at cutting speeds of 700, 900, and 1100 fpm to establish a tool life-cutting speed relationship for each brand of insert. Optical measurements of 0.015 inch flank wear were used as the criteria for comparison of machining data. For the semi-finishing test conditions investigated, results indicated that two titanium-carbide brands were superior in tool life and metal removed to the other brands by an approximate, minimum ratio of 2 to 1. An economic analysis of machining cost per piece indicated that one tool brand is more economical. (Author)

Machine Parts and Mechanisms

TID-12561 $15.00

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
AN ANALYTICAL AND EXPERIMENTAL STUDY OF THE STABILITY OF EXTERNALLY-PRESSURIZED, GAS-LUBRICATED THRUST BEARINGS, by L. Licht and H. G. Elrod, Jr. Interim rept. on Contract Nonr-2342(00). Feb 62, 219p. 1-A2049-12.

TID-13998 $3.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THE APPLICATION OF GAS-LUBRICATED BEARINGS TO HIGH-SPEED TURBO-MACHINERY, by M. W. Eusepi and D. D. Fuller. Quarterly technical rept. 1 Apr-30 June 61, on Contract AT(30-1)-2512. 12 Mar 62, 34p. Q-A2392-3-1.

TID-13999 $1.10

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THE APPLICATION OF GAS-LUBRICATED BEARINGS TO HIGH-SPEED TURBO-MACHINERY, by M. W. Eusepi and D. D. Fuller. Quarterly technical rept. 1 July-31 Aug 61, on Contract AT(30-1)-2512. 5 Apr 62, 8p. Q-A2392-3-2.

Transport, Traction and Hoist Facilities

Order from GPO $1.00 as
D 103.8:13/2

Board of Engineers for Rivers and Harbors, Washington, D. C.
THE PORT OF CHARLESTON, S. C., PART 2. 1961, rev. 1960, 44p. Port Series no. 13.

DESCRIPTORS: *Harbors, *South Carolina, Piers, Storage, Warehouses, Meteorological data, Cargo, Handling, Coal, Oils, Ores, Bridges, Hoist, Railroads, Conveyors, Maintenance.

Contents:
Port and harbor conditions
Port and harbor facilities
List of piers, wharves, and docks
List of storage warehouses

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D 103.8:43

Board of Engineers for Rivers and Harbors, Washington, D. C.
THE PORT OF CLEVELAND, OHIO. PART 2. 1961, rev. 1960, 51p. Port Series no. 43.

DESCRIPTORS: *Harbors, *Ohio, Piers, Storage, Warehouses, Meteorological data, Cargo, Handling, Coal, Oils, Ores, Bridges, Hoists, Railroads, Conveyors, Maintenance.

Port and harbor conditions
Port and harbor facilities
List of piers, wharves, and docks
List of storage warehouses

Order from GPO $2.75 as
D 103.10:5/961

Board of Engineers for Rivers and Harbors, Washington, D. C.
TRANSPORTATION LINES ON THE ATLANTIC, GULF, AND PACIFIC COASTS, 1961. 1961, 509p. Transportation Series 5.

DESCRIPTORS: *Transportation, *Shipping, Cargo, Navigation, Merchant vessels, Operation, Marine engineering, Atlantic Ocean, Pacific Ocean, Gulf of Mexico, Marine engineering, Passenger vehicles, Railroads, Inland waterways.

This is the annual revision of a report containing information on the transportation lines and their vessels operating on the Atlantic, Gulf, and Pacific Coasts and their tributary waterways, except the Mississippi River System and the Gulf Intracoastal Waterway. This report only covers vessels operating under the American flag. The report includes a description of vessels either operating or available for operation on the Atlantic, Gulf, and Pacific Coasts and their tributary waterways on 31 December 1960, and lists numerous unrigged craft not described in other publications. The names of the transportation lines (companies or individuals) numbering 1670 in all are arranged in an alphabetical index. Table 2 lists the various transportation lines in alphabetical sequence. Table 3 gives a description of the operations of the transportation lines.

MATERIALS

TID-14979 $1.60

American Air Filter Co., Inc., Louisville, Ky. GLASS FABRIC SWATCH TESTS ON SODIUM AND NaK FUMES FOR ATOMICS INTERNATIONAL, by John D. Harms. Rept. on Contract AT(11-1)-Gen-8. 9 June 61, 11p.

Order from GPO $1.75 as
D 101.52/2:961/v. 5

Army Research Office, Washington, D. C. ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 5. MATERIALS. 343p.

DESCRIPTORS: *Military research, *Materials, Metals, Organic materials, Inorganic substances, Test methods, Tests.

Contents:
MATERIALS
- Metallic materials
- Organic materials
- Inorganic non-metallic materials
- Materials sciences basic research
- Composite materials
- Materials testing & evaluation

PB 159 966 $8.60

General Electric Research Lab. [Schenectady, N. Y.] INVESTIGATION OF THE STOICHIOMETRIC AND STRUCTURAL VARIABLES WHICH AFFECT CONDUCTIVITY IN FERROMAGNETIC CERAMIC MATERIALS FOR USE IN MAGNETIC CIRCUITS, by F. H. Horn, G. A. Slack, and W. E. Engeler. Rept. for May 60-May 61, on Magnetic Materials, Contract AF 33(616)6499. [1961] 94p. 156 refs. ASD Technical rept. 61-284.

DESCRIPTORS: *Circuits, Magnetic materials, *Ferromagnetic materials, *Ceramic materials, Magnetite, Cobalt compounds, Iron, Ferrites, Single crystals, Resistance, Thermoelectricity, Thermal conductance, Optics, Reflection, Absorption, Temperature.

Results of investigations of the electrical resistivity, thermoelectric power, thermal conductivity, optical reflectivity, and absorption as functions of temperature and reported for magnetite and cobalt iron ferrites prepared as high-purity single crystals with controlled stoichiometry. New data are compared with those in the literature. The influence of the magnetic transition on thermal conductivity in the ferrites is deduced by a comparison with data for nonmagnetic spinels. An idealized model for the electrical properties is partially developed from the electrical and optical results. (Author)

PB 181 311 $1.00

Naval Civil Engineering Lab., Port Hueneme, Calif. AN EVALUATION OF ORGANOTIN COMPOUNDS AS PRESERVATIVES FOR MARINE TIMBERS, by H. P. Vind and H. Hochman. 19 Mar 62, 36p. 17 refs. Technical rept. R 188.

DESCRIPTORS: *Wood, Preservation, *Marine borers, Control, *Tin compounds, *Organic compounds, Tests, Toxicity, Solubility, Odors, Chemical properties, Biology

An investigation was made of organotin compounds for treating timbers to prevent marine borer attack. Laboratory screening tests and literature surveys were conducted to determine the biological, physical, and chemical properties of various compounds. Toxicity to marine borers, solubility in sea water, volatility, odor, and chemical stability were evaluated. (Author)

PB 159 975 $1.60

Stanford Electronics Labs., Stanford U., Calif. ELECTROFORMED CERAMIC-TO-METAL SEAL FOR VACUUM TUBES, by M. D. Hare, R. F. Keller, and H. A. Meneses. Rept. on Contract DA 36-039-sc-73178. 17 Nov 58, 14p. 1 ref. Technical rept. no. 453-3.

DESCRIPTORS: *Electron tubes, Traveling wave tubes, *Seals, Ceramic materials, Metal seals, Design, Electroforming, Bonding, Temperature.

This report is a description of a method used in making vacuum-tight ceramic-to-metal seals at room temperature. The seals will withstand subsequent high-temperature firing.

Fuels, Lubricants, and Hydraulic Fluids

PB 181 312 $0.50

Naval Civil Engineering Lab., Port Hueneme, Calif. INFRARED MEASUREMENT OF SULFONATE ADDITIVES, by J. B. Crilly and R. J. McGowan. Final rept. 11 Apr 62. 12p. 3 refs. Technical rept. R 190.

DESCRIPTORS: *Lubricants, *Lubricant additives, Additives, *Sulfonates, Infrared spectroscopy

Infrared spectra of 18 oil samples, to which varying concentrations of sulfonate were added, were made and plotted on graphs. It was shown that there was a correlation between concentration and absorption of the sulfonic inhibitors. The method is based on the fact that sulfonates absorb at wave lengths between 9 and 10 microns when exposed to infrared radiation. This absorption was found to be directly proportional to the concentration of the sulfonates and so may be used to measure content of sulfonates in oils.

Y-1387 $1.00

Union Carbide Nuclear Co., Oak Ridge, Tenn.
COMPUTER SCHEDULING OF LUBRICATION, by D. T. Martin, W. M. Williams, Jr., and C. W. Wilson Rept. on Contract W-7405-eng-26. 17 May 62, 41p.

Paints and Finishes

PB 181 309 $0.50

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
ANALYSIS OF EPOXY COATING MATERIALS. a. RAPID DETECTION IN PAINTED SURFACES. b. GRAVIMETRIC MEASURE IN VEHICLES AND OTHER SOLUTIONS, by M. H. Swann. 31 Jan 62, 10p. 4 refs. Rept. no. CCL # 114.

DESCRIPTORS: *Epoxy resins, Resins, *Coatings, Materials, Test methods, Identification, Surfaces, Gravimetric analysis, Quantitative analysis.

Two related methods of analysis for epoxy resins of the bisphenolepichlorohydrin type are described that allow fast, dependable identification of painted surfaces containing these resins and a means of measuring the epoxy portion of most modifications including amine, polyamide and phenol catalyzed enamels, fatty acid esters, and simple mixtures. (Author)

PB 181 310 $0.75

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
THE IDENTIFICATION OF CARBOXYLIC ACIDS IN ALKYD AND POLYESTER COATING RESINS BY PROGRAMMED TEMPERATURE GAS CHROMATOGRAPHY, by G. G. Esposito. 28 Feb 62, 17p. 7 refs. Rept. no. CCL #116.

DESCRIPTORS: Alkyd resins, Polymers, Esters, *Coatings, *Resins, *Carboxylic acids, Acids, Identification, *Gas chromatography, Linear programming, Temperature.

A temperature programmed gas-liquid chromatographic (TPGLC) technique is utilized to identify dicarboxylic and monocarboxylic acids present in alkyd resins. The method is valuable as an adjunct to certain nonspecific quantitative dibasic acid procedures which require the absence of interfering acids. An alkyd resin is subjected to rapid transesterification with an alkaline catalyst to form methyl esters of the acids present. The methyl esters are separated by gas-liquid chromatography on polar and nonpolar columns and identified by their relative retention times. (Author)

Plastics

TID-15191 $1.60

Institute of Tech., U. of Minn., Minneapolis
EFFECTS OF ATOMIC RADIATION AND OF MOLECULAR ORINETATION ON MECHANICAL BEHAVIOR OF LINEAR SOLID HIGH POLYMERS. Rept. on Contract AT(11-1)-532. (nd). 13p.

PB 181 301 $0.75

Plastics Lab., Princeton U., N. J.
STUDIES OF THE COLD-WORKING OF POLYETHYLENE, by Paul H. Rothschild and Bryce Maxwell. Rept. on Contract DA 36-039-sc-78105. 1 Oct 60, 29p. 8 refs. Technical rept. no. 59C, AD-245 816.

DESCRIPTORS: *Plastics, *Polymers, *Ethylenes, Mechanical properties, Crystal structure, Stresses; Density, Rolling mills.

The cold working of polyethylene by means of a rolling technique has been investigated. This process was found to produce an oriented structure with anisotropic mechanical properties. The degree of orientation resulting from rolling was found to be dependent on the crystalline structure and degree of branching in the polyethylene, the amount of cold working, and the temperature (below the melting point) at which the material was cold-worked. Cold-worked polyethylene was found to exhibit higher strength in the direction of cold working than unworked material and also to exhibit a high degree of ductility both parallel and perpendicular to the direction of working. In addition, the cold-worked material exhibited a lower density and a slower rate of stress relaxation than unworked material. (Author)

PB 181 316 $0.75

Plastics Technical Evaluation Center, Picatinny Arsenal, Dover, N. J.
HEALTH HAZARDS AND TOXICITY OF PLASTICS: A CROSS-INDEXED BIBLIOGRAPHY, by Arnold E. Molzon. Mar 62, 25p. 73 refs. Plastec note 5.

DESCRIPTORS: *Plastics, Processing, Public health, *Hazards, *Toxicity, *Bibliography.

Selected references pertaining to the toxicity and/or health hazards present during the fabrication of plastics and their normal use are listed. References on health hazards of plastics in medical applications are treated in a separate PLASTEC note. These items are cross-indexed according to (1) type or class of plastic material; (2) subject such as: curing agent, dermatosis, dust, fire, health hazard; and (3) author. The sources searched included: Plastics Abstracts, Proceedings of both the Annual Conferences of the Society of Plastics Engineers and the Reinforced Plastics Division of the Society of the Plastics Industry, Applied Science and Technology Index, Index Medicus, Resin. Rubber. Plastics Yearbook, and the ASTIA Report Bibliography on Plastics. (Author)

PB 181 315 $1.25

Plastics Technical Evaluation Center, Picatinny Arsenal, Dover, N. J.
PLASTICS IN THE MEDICAL INDUSTRY: A CROSS INDEXED BIBLIOGRAPHY, by Arnold E. Molzon. Mar 62, 51p. 204 refs. Plastec note 4.

DESCRIPTORS: Surgery, Plastic surgery, Prosthetics, *Medical equipment, Dentures, Materials, *Plastics, Public health, Hazards, Toxicity, *Bibliography, *Medical supplies.

Selected references pertaining to the use of plastics in the medical industry are listed herein. Included, because of their pertinent relationship, are references on the toxicity of plastics. These items are cross-indexed according to (1) type or class of plastic material; (2) subject such as: arterial, dental applications, dust, health hazard, implants, prosthesis, toxicity; and (3) author. The sources searched included: Plastics Abstracts, Proceedings of both the Annual Conferences of the Society of Plastics Engineers and the Reinforced Plastics Division of the Society of the Plastics Industry, Applied Science and Technology Index Medicus, Resin. Rubber. Plastics Yearbook, and the ASTIA Report Bibliography on Plastics. (Author)

MATHEMATICS

PB 159 961 $2.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A TABLE OF THE FACTORIAL NUMBERS AND THEIR RECIPROCALS FROM 1! THROUGH 1000! TO 20 SIGNIFICANT DIGITS, by G. W. Reitwiesner. Feb 51, 23p. Technical note no. 381.

DESCRIPTORS: Mathematics, Numbers, *Tables.

The data presented here extend BRL Technical Note No. 106 through 1000! and furnish the reciprocal of each factorial number. All computations were performed by the ENIAC, employing data developed in the determination of more than 2500 digits of e through the formula $e = \sum (n!)^{-1}$, to an accuracy of not less than 62 significant digits, and each factorial number was multiplied by its reciprocal to produce unity to within an error not greater than 10^{-62}. The data presented here show the first 20 significant digits of the results, rounded-off from the 21st digit. (Author)

Computing Devices

ANL-6521 $1.75

Argonne National Lab., Ill.
A GENERAL 704 SERVICE LIBRARY, by P. S. Bagus, C. C. J. Roothaan and others. Rept. on Contract W-31-109-eng-38. Mar 62, 70p.

PB 159 971 $1.10

Diamond Ordnance Fuze Labs., Washington, D. C.
STANDARDIZATION OF THE 5 X 7 FONT. 15 Jan 54. 10p. DOFL rept. TR-39; AD-221 312.

DESCRIPTORS: *Printing, *Data processing systems, Automatic, Design, *Reading machines, Standardization.

The present large-scale development of automatic data-processing machinery has concentrated attention and engineering effort on the problems of rapid printing and automatic reading of printed or typed matter. Several commercial machines employ elemental printing (most on a 5 x 7 font) to reach desired printing speeds. At the present stage of development, however, reading machines are not sophisticated enough to read types having varied sizes and shapes. Therefore, it becomes imperative that a standard font, suitable for both reading and elemental printing, be adopted by the manufacturers and users of information machines. It is proposed that a standard 5 x 7 font be adopted for all business machine use. Desirable Characteristics of a Universal Business Machine Font: Some of the desirable characteristics of the font chosen are: (1) It is easily reproduced by anyone without requiring a master drawing. It can be reproduced by means of simple machinery generally available and operated by mechanics of ordinary skills. (2) The font is well adapted to high-speed printing both by means of elements and by means of conventional type. (3) The type that was chosen is well adapted to be read by machines that are now being developed. (4) It is clear and legible for reading by human operators and is not aesthetically objectionable. (Author)

TID-14158 $4.60

Digital Computer Lab., U. of Illinois, Urbana
HIGH-SPEED COMPUTER PROGRAM. PART II. CIRCUIT RESEARCH PROGRAM. PART III. DATA REDUCTION METHODS. PART IV. ILLIAC USE AND OPERATION. PART V. IBM 650 USE AND OPERATION. PART VI. GENERAL LABORATORY INFORMATION. Technical progress rept. July 61, 46p.

TID-14295 $5.60

Digital Computer Lab., U. of Illinois, Urbana
HIGH-SPEED COMPUTER PROGRAM. PART II. CIRCUIT RESEARCH PROGRAM. PART III. DATA REDUCTION METHODS. PART IV. MATHEMATICAL RESEARCH USING COMPUTERS. PART V. ILLIAC USE AND OPERATION. PART VI. IBM 650 USE AND OPERATION. PART VII. GENERAL LABORATORY INFORMATION. Technical progress rept. Aug 61, 51p.

TID-14296 $5.60

Digital Computer Lab., U. of Illinois, Urbana
HIGH-SPEED COMPUTER PROGRAM. PART II. CIRCUIT RESEARCH PROGRAM. PART III. DATA REDUCTION METHODS. PART IV. MATHEMATICAL METHODS. PART V. ILLIAC USE AND OPERATION. PART VI. IBM 650 USE AND OPERATION. PART VII. GENERAL LABORATORY INFORMATION. Technical progress rept. Sep 61, 52p.

PB 159 955 $5.60

Stanford Research Inst., Menlo Park, Calif.
HIGH SPEED COMPONENTS FOR DIGITAL COMPUTERS, by Douglas Englebart. Quarterly engineering rept. 2, 1 Sep-30 Nov 58, on Contract AF 33(616)5804. Feb 59, 52p. 10 refs. SRI Proj. 2548; AD-211 620.

DESCRIPTORS: *Digital computers, Computers, *Magnetic cores, Thin films, Magnetic materials, Computer logic, Design, Operation.

An extension of the all-magnetic multi-aperture device (MAD) techniques, recently developed at Stanford Research Institute, to bit rates of the order of five megacycles or better is being studied. The best possibility seems to be to use thin magnetic film elements assembled into arrays of three or more elements in such a manner that the arrays behave, in appropriate all-magnetic networks, in the same manner as do the MADs. A general introductory analysis of this technique of synthesizing multi-aperture-device behavior by means of an array of simple, single-path, square-loop magnetic elements makes up most of the report. The opportunity to make use of the uniaxial-anisotropy and cross-field features of thin magnetic films, together with the unsurpassed speed of these elements, are shown in the final sections to have given thin films an apparent advantage in this application over other possible high-speed magnetic elements. (Author)

PB 159 956 $2.60

Stanford Research Inst., Menlo Park, Calif.
HIGH SPEED COMPONENTS FOR DIGITAL COMPUTERS, by Douglas Engelbart. Quarterly engineering rept. 3, Part A, 1 Dec 58-28 Feb 59, on Contract AF 33(616)5804. Apr 59, 23p. 2 refs. SRI Proj. 2548; AD-216 749.

DESCRIPTORS: *Digital computers, Computers, *Magnetic cores, Thin films, Magnetic materials, Computer logic, *Circuits.

Results are given of special studies in which explicit consideration was given to the use of thin-films. It was found that, if enough internal gain of switched-flux levels can be realized within the film elements to overcome the higher flux-transfer losses expected, there are modifications of the basic synthetic-aperture-device (SAD) techniques which may provide significant simplifications in the all-magnetic-logic applications being sought. Fabrication and testing equipment are almost ready to yield experimental data, and further application analysis is planned to help direct the experimental efforts. (Author)

MECHANICS

DC-58-4-212 $5.60

General Electric Co., Cincinnati, Ohio
SOLUTION OF A NON-AXISYMMETRIC SURFACE LOAD PROBLEM FOR A CIRCULAR CYLINDER USING FLUGGE'S EQUATIONS, by D. R. Riley. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 7 May 58, 47p.

TID-15206 $5.60

Institute of Tech., U. of Minn., Minneapolis
A THEORY FOR THE EFFECT OF PLASTIC DEFORMATION ON ELASTIC BEHAVIOR OF A MODEL SOLID, by T. S. Wu and C. C. Hsiao. Technical rept. no. 15 on Contract AT(11-1)-532. Apr 61, 58p.

NASA N62-10919 $1.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
COMBINATIONS OF TEMPERATURE AND AXIAL COMPRESSION REQUIRED FOR BUCKLING OF A RING-STIFFENED CYLINDER, by Melvin S. Anderson. Apr 62, 36p. 6 refs. NASA-TN-D-1224.

Order from GPO $0.35 as
NAS 1.12:116

National Aeronautics and Space Administration, Washington, D. C.
NUMERICAL PREDICTIONS OF RADIATIVE INTERCHANGE BETWEEN CONDUCTING FINS WITH MUTUAL IRRADIATIONS, by Max. A. Heaslet and Harvard Lomax. 1961, 22p. NASA Technical rept. R-116.

DESCRIPTORS: *Fins, Thermal conductivity, Heat transfer, Thermal radiation, Temperature, Design, Mathematical prediction, Numerical analysis, Integral equations, Differential equations, Satellite vehicles.

Analytical and numerical methods are developed that predict the flux of radiant energy from a family of thin, planar, conducting fins. For a symmetrical array of fins, extending out from a common edge, conducting heat internally, and radiating diffusely, a nonlinear integro-differential equation is derived and solved. Specific results are given for parametric variations of conduction, emissivity, fin geometry, and base temperature. The techniques of calculation are studied with possible extensions in mind. (Author)

Order from GPO $0.40 as
NAS 1.12:117

National Aeronautics and Space Administration, Washington, D. C.
TURBULENT BOUNDARY-LAYER SEPARATION INDUCED BY FLARES ON CYLINDERS AT ZERO ANGLE OF ATTACK, by Donald M. Kuehn. 1961, 26p. NASA Technical rept. R-117.

DESCRIPTORS: *Turbulent boundary layer, Boundary layer, Separation, *Cylindrical bodies, Bodies of revolution, *Flares, Supersonic flow, Pressure, Geometry, Thermodynamics, Wind tunnel models, Model tests, *Aerodynamics.

Separation caused by the pressure rise induced by flares has been experimentally investigated in the Mach number range of 1.5 to 5.0 and in the Reynolds number range (based on boundary-layer thickness) of 1.5×10^4 to 12×10^4. The purpose of the investigation was to determine the model geometry and flow conditions for which separation can be expected for a turbulent boundary layer of zero pressure gradient on the cylinder approaching the flare. Comparisons are made of the boundary-layer-separation characteristics of these three-dimensional flares with two-dimensional separation results from a previous investigation. (Author)

Hydrodynamics, Hydraulics, and Hydrostatics

NASA N62-10863 $3.60

Automatic Control Center, Purdue U., Lafayette, Ind.
DYNAMIC RESPONSE OF A HYDRAULIC LINE, by Rufus Oldenburger and Raymond Eugene Goodson. 27[13]p. 6 refs. NASA Grant NsG 28-59.

WAPD-TM-240 $2.25

Bettis Atomic Power Lab., Pittsburgh, Pa.
TITE. A DIGITAL PROGRAM FOR THE PREDICTION OF TWO-DIMENSIONAL TWO-PHASE HYDRODYNAMICS, by R. I. Miller and R. S. Pyle. Rept. on Contract AT(11-1)-GEN-14. Feb 62, 112p. 12 refs.

Order from GPO $0.45
I 19.13:1369-D

Geological Survey, Washington, D. C.
FLOW THROUGH OPENINGS IN WIDTH CONSTRICTIONS. RIVER HYDRAULICS, by Jacob Davidian, P. H. Carrigan, Jr., and John Shen. 1962. 31p. 6 rers. Geological Survey Water-Supply paper 1369-D.

DESCRIPTORS: *Inland waterways, *Hydraulic research.

Laboratory experiments and an analysis were directed toward the development of methods for (a) computing discharge through multiple-opening constrictions, (b) apportioning a given total discharge among the several openings, and (c) predicting the backwater caused by the constriction. The division of flow among the openings was related to the relative area of each opening, and the relative velocity in the channel immediately upstream from each opening. On the basis ot this relationship, the boundaries of the flow channel approaching each opening were established. The head-discharge and backwater characteristics of each opening were then analyzed separately. It is shown that the relations developed for the constriction with a single opening are applicable to each opening of a multiple-opening constriction once the boundaries of the separate flow channels have been established. (Author)

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I 19.13:1539-W

Geological Survey, Washington, D. C.
HYDRAULICS OF RIVER CHANNELS AS RELATED TO NAVIGABILITY. AN EVALUATION OF THE FORCES REQUIRED TO NAVIGATE RIVERS AS A BASIS FOR COMPARING NAVIGABILITY. CONTRIBUTIONS TO THE HYDROLOGY OF THE UNITED STATES, by W. B. Langbein. 1962, 30p. 12 refs. Geological Survey Water-Supply paper 1539-W.

DESCRIPTORS: *Inland waterways, *Hydraulic research, Navigation, Drag, Hydrology, Water supplies.

Contents:
Hydraulic geometry of river channels
- Downstream variation in hydraulic geometry
- Variations in velocity and depth in a river reach

Hydraulics of vessels
- Resistance formulas
- Specific tractive force
- Shallow-water drag
- Slope drag
- Loss of bed clearance with speed
- Rounding river bends

Navigability of rivers
- Minimum specific tractive force
- Transport capacity.

NASA N62-10841 $2.60

Southwest Research Inst., San Antonio, Tex.
RESEARCH ON LIQUID DYNAMICS IN MISSILE FUEL TANKS. Quarterly Progress Report No. 6, by H. Norman Abramson, Ulric S. Lindholm and others. 1 Oct 61. 22p. 6 refs. NASA Contract NASw-146; SwRI Project 4-961-2.

NASA N62-10842 $1.60

Southwest Research Inst., San Antonio, Tex.
RESEARCH IN LIQUID DYNAMICS IN MISSILE FUEL TANKS. Quarterly Progress Report No. 7, by Ulric S. Lindholm, Daniel D. Kana and others. 1 Jan 62. 13p. refs. NASA Contract NASw-146; SwRI Project 4-961-2.

METALLURGY

USBM-U-921 $0.75

Albany Metallurgy Research Center, Ore.
METALLURGICAL PROGRESS REPORT NO. 14. Quarterly rept. 1 Jan-31 Mar 62, on Contract AT(11-1)-599. 27p.

ANL-6327 $1.00

Argonne National Lab., Ill.
RECRYSTALLIZATION IN ROLLED URANIUM SHEET, by Lowell T. Lloyd and Melvin H. Mueller. Final rept. on Contract W-31-109-eng-38. Mar 62, 45p. 14 refs.

TID-7626(Pt. 1) $2.75

Atomic Energy Commission. Div. of Reactor Development, Washington, D. C.
NASA-AEC LIQUID METALS CORROSION MEETING, DECEMBER 14-15, 1961, BROOKHAVEN NATIONAL LABORATORY. Apr 62, 155p. 14 refs.

Order from GPO $0.50 as
I 28.27:8048

Bureau of Mines, Washington, D. C.
BIBLIOGRAPHY OF ZIRCONIUM: SUPPLEMENT TO INFORMATION CIRCULARS 7771 AND 7830, by Eleanor Abshire. 1962, 99p. 886 refs. Information Circular 8048.

DESCRIPTORS: *Bibliography, *Zirconium, Metals.

The present bibliography consists of references (with abstracts) to pertinent literature on zirconium. It contains 780 literature references and 107 U. S. and foreign patents. The following reference sources have been used: ASM Metals Review, ASTIA Index, AEC (Oak Ridge) TID Index, Battelle Technical Review, Bibliography of Technical Reports, British Abstracts, Chemical Abstracts, Crerar Metal Abstracts, Current List of Medical Literature, Education Index, Engineering Index, Industrial Arts Index, Nuclear Science Abstracts, Quarterly Cumulative Index Medicus, and Readers' Guide. The material in this bibliography is divided into two sections: Literature and Patents. Each section is arranged alphabetically by author. Secondary authors are cross-indexed. Titles of periodicals or organizations are used as the authors in anonymous references. Only reports actually acquired and reviewed have been included. (Author) (See also PB 134 528)

TID-14740 $8.10

California Inst. of Tech., Pasadena
TRANSITIONS IN CHROMIUM, by Jean-Francois Marin. Technical rept. no. 1 on Contracts AT(04-3)-221 and Nonr-220(30). Jan 62, 85p. 38 refs.

PB 161 641 $0.75

National Bureau of Standards, Washington, D. C.
DETAILED TECHNIQUES FOR PREPARING AND USING HARD GALLIUM ALLOYS, by George G. Harman. Apr 62, 23p. 7 refs. Technical note 140.

DESCRIPTORS: *Gallium alloys, Preparation, Hardness, Bonding, Dental materials, Metal powders.

This report presents an expansion and clarification of techniques for preparing and using dental-amalgam-type gallium alloys for industrial and scientific uses. New material, such as hardness of the alloys and discussions of the bonding mechanism are presented. A different class of bonding alloys based on the same principals but not incorporating gallium are described, along with application details. (Author)

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C 13.44:25

National Bureau of Standards, Washington, D. C.
STANDARD X-RAY DIFFRACTION POWDER PATTERNS, by Howard E. Swanson, M. C. Morris and others. 9 Mar 62, 56p. 104 refs. NBS Monograph 25, section 1.

DESCRIPTORS: *Powder metallurgy, *X-ray diffraction analysis, Lattices, Refractive index, Spectrographic analysis, Crystallization, Microstructure, Powder metals.

Forty-six standard X-ray diffraction powder patterns are presented. Fourteen are to replace twelve patterns already given in the X-ray Powder Data File, and thirty-four are for substances not previously included. The X-ray Powder Data File is a compilation of diffraction patterns from many sources and is used for the identification of unknown crystalline materials by matching spacing and intensity measurements. The patterns were made with a Geiger counter X-ray diffractometer, using samples of high purity. The d-values were assigned Miller indices determined by comparison with calculated interplanar spacings and from space group considerations. The densities and lattice constants were calculated, and the refractive indices were measured whenever possible. (Author)

NMI-4949(Pt. II) $2.00

Nuclear Metals, Inc., Concord, Mass.
TECHNICAL PAPERS OF THE TWELFTH METALLOGRAPHIC GROUP MEETING HELD AT MALLINCKRODT CHEMICAL WORKS URANIUM DIVISION, ST. LOUIS, MISSOURI, FEBRUARY 26, 27, 1958, comp. by H. P. Roth. 12 May 61, 79p.

OTS SB-490 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
METALWORKING. PART II: MACHINE AND CUTTING TOOLS (SUPPLEMENT TO SB-461). Feb 62, 17p. 191 refs. OTS Selective Bibliography SB-490.

DESCRIPTORS: *Metals, *Machine tools, *Cutting tools, Machining, Automatic, Programming, *Bibliography, Ceramic materials, Refractory materials, Life expectancy, Grinders.

Lists 191 foreign and domestic reports added to the OTS collection during the period April 1961 to February 1962. Covers research on numerically controlled and automatically programmed tool systems (APT); automatic data preparation for tool systems; ultra high speed and high temperature machining; ultrasonic grinding; ceramic tools; machining of refractory metals; tool wear and life expectancy among other subjects.

PB 159 958 $2.60

Pitman-Dunn Labs. Group, Frankford Arsenal Philadelphia, Pa.
MECHANICAL PROPERTIES OF SIX PERCENT COPPER-TITANIUM ALLOY STRIP AND BAR, by H. R. Pritchard. Sep 59, 22p. 2 refs. Test rept. T60-4-1.

DESCRIPTORS: *Copper alloys, *Titanium alloys, Alloys, Sheets, Rods, Mechanical properties, Aging, Military requirements, Metal plates.

This study was conducted on 6 percent copper-titanium alloy strip and bar to provide additional mechanical property data for Military Specification MIL-C-46029(Ord), Copper-Titanium Alloy; Plate, Bar, Sheet and Strip, and to establish short-time aging cycles. (Author)

TID-15139 $1.10

Rensselaer Polytechnic Inst., Troy, N.Y.
ELECTRICAL RESISTANCE MEASUREMENTS OF SINTERING, by F. V. Lenel, M. J. Salkind, and others. Rept. on Contract AT(30-1)-2408. 8p.

TID-15137 $1.60

Rensselaer Polytechnic Inst., Troy, N. Y.
THE DRIVING FORCE FOR SHRINKAGE IN COPPER POWDER COMPACTS DURING THE EARLY STAGES OF SINTERING, by F. V. Lenel, H. H. Hausner, and others. Rept. on Contract AT(30-1)-2408. 1961. 19p.

NASA N62-10849 $4.60

Stanford U., Calif.
INVESTIGATION OF A TECHNIQUE FOR THE PRODUCTION OF METALLURGICAL STRUCTURES CONTAINING UNIFORMLY DISPERSED STABLE PARTICLES. Final Rept. by Troy W. Barbee, Jr., Douglas L. Keith and others. 1 July 61. 47p. 14 refs. DMS Rept. 61-12; NASA Grant NsG 53-60.

NASA N62-10683 $7.60

Thermionic Products Co., Plainfield, N. J.
INVESTIGATION TO DETERMINE THE EFFECTS OF CONTROLLED THERMAL TREATMENT IN REACTIVE GASEOUS ATMOSPHERE ON THE DUCTILITY AND SELECTED OTHER FABRICATION PROPERTIES OF MOLYBDENUM AND MOLYBDENUM ALLOY STRIP. Final Report, [1 Sep 60-28 Feb 62] by T. B. Malloy, Jr. [1962] 49[26]p. NASA Contract NASw-178.

Ferrous Metals

PB 181 318 $1.00

Watertown Arsenal Labs., Mass.
EFFECTS OF VARIABLES IN CHARPY IMPACT TESTING, by Norbert H. Fahey. Mar 62, 38p. 5 refs. Technical rept. WAL TR 112.5/2.

DESCRIPTORS: Test methods, *Test equipment, Machining, Cooling, Gun barrels, Failure (Mechanics), *Steel, Tests, Industrial mobilization, Ordnance steel, Impact shock.

Although the Charpy impact test can be and is an accurate reproducible research and inspection tool, the magnitude of error that may occur if certain precautions are not observed is not generally recognized. It can be stated that the testing variables and machine design variations in the Charpy test cause erroneously high energy values since they retard the swing of the pendulum or otherwise cause excessive energy losses. This report discusses the effects of the following factors: (a) condition of the machine itself, (b) methods of machining and finishing the test specimen, and (c) the techniques of cooling and testing specimens. In addition, solutions to the problem are offered. (Author)

PB 181 320 $1.00

Watervliet Arsenal, N. Y.
A STUDY OF THE WELD HEAT-AFFECTED ZONES IN MODIFIED 4330 AND 5 PER CENT CHROMIUM STEELS, by Keh-Chang Wu. Dec 61, 33p. 6 refs. Technical rept. WVT-RI-6110-R.

DESCRIPTORS: *Chromium, *Steel, Ordnance steel, Welding, Arc welding, Welded joints, Temperature, Microstructure, Tests, Impact shock.

The weldability of modified 4330 steel and centrifugally cast 5 per cent chromium steel were investigated. The microstructure in the heat-affected zone at various locations was reproduced in Charpy impact test specimens which were tested at various temperatures from -60° to +212°F. It was found that under the same welding conditions employed in the welding of the M68 105mm gun bore evacuator, the weldability and low temperature impact strength were better in the modified 4330 steel than in the centrifugally cast 5 per cent chromium steel. (Author)

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

NAS-NS-3050 $3.50

Argonne National Lab., Ill.
THE RADIOCHEMISTRY OF URANIUM, by James E. Grindler. Mar 62, 365p. 698 refs.

NAA-SR-7137 $2.00

Atomics International, Canoga Park, Calif.
THE FAIM CODE A MULTIGROUP, ONE-DIMENSIONAL DIFFUSION EQUATION CODE, by D. C. Baller. Rept. on Contract AT(11-1)-GEN-8. 15 Apr 62, 89p. 6 refs.

PB 159 960 $2.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A NEW MONTE CARLO METHOD FOR SOLVING NEUTRON AND GAMMA RAY TRANSPORT PROBLEM, by Frank J. Allen. Apr 58, 29p. 8 refs. Memo rept. no. 1135.

DESCRIPTORS: *Numerical methods and procedures, *Neutrons, *Gamma rays, *Neutron scattering, Scattering, Integral equations, Differential equations, Probability, Quantum statistics, *Transport properties.

A method is developed and compared in efficiency with the standard Monte Carlo method. An idealized transport equation for which there exists a simple analytic solution is used to effect the comparison. It is shown that the proposed method is much more efficient than the standard Monte Carlo method. (No biased sampling techniques are used.) (Author)

WAPD-TM-235 $2.25

Bettis Atomic Power Lab., Pittsburgh, Pa.
SPAN-3-A SHIELD DESIGN PROGRAM FOR THE PHILCO-2000 COMPUTER, by W. H. Guilinger, N. D. Cook, and P. A. Gillis. Rept. on Contract AT(11-1)-GEN-14. Feb 62, 98p, 21 refs.

TID-14957 $5.60

Chicago U., Ill.
PROGRESS REPORT ON [NUCLEAR PHYSICS], by Samuel K. Allison. Rept. on Contract AT(11-1)-238. 1 Jan 61-31 Dec 61, 56p.

GA-2211 $0.75

General Atomic Div., General Dynamics Corp., San Diego, Calif.
DETERMINATION OF THORIUM AND URANIUM IN GRAPHITE BY INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS, by John Buchanan. Rept. on Contract AT(04-3)-314. 18 Jan 62, 31p. 23 refs.

APEX-515 $16.00

General Electric Co., Cincinnati, Ohio
CROSS SECTIONS FOR REACTOR ANALYSIS, by W. B. Henderson and Mary J. Stanley. Rept. on Contracts AF-33(600)-38062 and AT(11-1)-17. May 57, 243p.

DC-55-12-81 $10.50

General Electric Co., Cincinnati, Ohio.
SURVEY AND EVALUATION REPORT OF RADIATION DAMAGE TO ORGANIC LIQUIDS, PART IV, by C. G. Collins. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-28062. 12 Dec 55, declassified. 136p.

PNE-113P $1.00

Lawrence Radiation Lab., U. of California, Livermore.
RESONANCE NEUTRON ACTIVATION MEASUREMENTS, by M. Lindner. Preliminary rept. on Plowshare Program, Project Gnome. 2 May 62, 36p. 30 refs.

TID-15205 $1.60

Minnesota U., Minneapolis
ANALYSIS OF ORIENTATION AND STRENGTH OF BRANCHED POLYMER MODEL SOLID, by T. S. Wu and C. C. Hsaio. Technical rept. no. 14 on Contract AT(11-1)-532. Mar 61, 20p.

TID-15123 $1.60

Minnesota U., Minneapolis.
STUDY OF DECOMPOSITION AND RECOMBINATION REACTIONS OF WATER IN THE VAPOR PHASE IN THE PRESENCE OF RADIATION. Technical progress rept. on Contract AT(11-1)-1032. 1962. 14p.

TID-15127 $1.60

Nebraska U., Lincoln.
STOPPING POWERS OF HYDROCARBON VAPORS, by John T. Park and E. J. Zimmerman. Rept. on Contract AT(11-1)-35. 1962. 12p.

TID-15130 $1.60

Nebraska U., Lincoln.
STOPPING CROSS SECTIONS OF SOLID HYDROCARBONS FOR LOW ENERGY H^+ AND He^+ IONS, by Chester A. Sautter and Edward J. Zimmerman. Rept. on Contract AT(11-1)-35. 1962. 20p.

NAS-NS-3056 $0.50

Oak Ridge National Lab., Tenn.
THE RADIOCHEMISTRY OF PHOSPHORUS, by W. T. Mullins and G. W. Leddicotte. Mar 62, 36p. 116 refs.

NAS-NS-3055 $0.50

Oak Ridge National Lab., Tenn.
THE RADIOCHEMISTRY OF SODIUM, by W. T. Mullins and G. W. Leddicotte. Mar 62, 48p. 175 refs

TID-15124 $4.60

Ohio State U. Research Foundation, Columbus
ANNUAL REPORT ON NUCLEAR PHYSICS RESEARCH, 1 FEB 61 - 31 JAN 62, by J. C. Harris, D. F. Herring, and K. W. Jones. Rept. no. 12 on Contract AT(11-1)-147. 31 Jan 62, 45p.

TID-15147 $10.10

Purdue U., Lafayette, Ind.
MASS AND CHARGE DISTRIBUTION STUDIES IN THE FISSION OF Np^{237} AND Pu^{239} BY IMMEDIATE ENERGY HELIUMS IONS, by James A. Powers. Doctoral thesis. Rept. on Contract AT(11-1)-347. Jan 62, 124p.

RAI-301 $1.75

Radiation Applications Inc., Long Island City, N. Y.
THE ACCELERATING EFFECT OF ADDITIVES ON RADIATION-INDUCED GRAFT POLYMERIZATION, by George Odian, Terese Acker and others. Rept. on Contract AT(30-1)-2318. 31 Jan 62, 58p. 21 refs.

RAI-304 $2.60

Radiation Applications, Inc., Long Island City, N. Y.
A STUDY OF THE MECHANISM OF RADIATION-INDUCED GELATION IN MONOMER-POLYMER MIXTURES, by George Odian, Bruce S. Bernstein, and others. Quarterly summary rept., 1 Nov 61-31 Jan 62, on Contract AT(30-1)-2816. 8 May 62, 25p.

SL-1868(Supl. 1) $2.00

Sargent and Lundy, Chicago, Ill.
SUPPLEMENT TO REACTOR CONTAINMENT DESIGN STUDY, by R. A. Johnson and I. Nelson. Rept. on Contract AT(11-1)-938. 23 Apr 62, 127p.

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Wayne State U., Detroit, Mich.
ELECTRON PARAMAGNETIC RESONANCE STUDIES OF RADIATION EFFECTS IN SOLIDS AND CHEMICAL COMPOUNDS, by Yeong Wook Kim. Technical progress rept. on Contract AT(11-1)-1054. 1 May 62, 16p.

Elementary Particles

NASA N62-10690 $2.60

California Inst. of Tech., Pasadena
ON THE EFFECT OF GEOMAGNETIC FLUCTUATIONS ON TRAPPED PARTICLES, by Leverett Davis, Jr., and David E. Chang. [1962?] 26p. 8 refs. NASA Grant NsG 151-61.

UCRL-10118 $1.75

Lawrence Radiation Lab., U. of California, Berkeley.
THE MEAN LIFE OF THE NEUTRAL PI MESON, by Maung Hla Shwe. Rept. on Contract W-7405-eng-48. June 62, 71p. 49 refs.

Instruments and Installations

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HIGH-TEMPERATURE KNUDSEN EFFUSION CELL ASSEMBLY, by E. G. Råuh, R. C. Sadler, and R. J. Thorn. Rept. on Contract W-31-109-eng-38. Apr 62, 5p.

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ANNUAL PROGRESS REPORT FOR DECEMBER 1960-NOVEMBER 1961 [ON LINEAR ACCELERATOR] Contract AT(11-1)-50. Nov 61, 131p.

TID-15128 $1.60

Nebraska U., Lincoln.
SCINTILLATION RESPONSE OF CRYSTALS, by E. J. Zimmerman and J. M. Bunch. Rept. on Contract AT(11-1)-35. 1962. 14p.

NAS-NS-3105 $1.50

Oak Ridge National Lab., Tenn.
DETECTION AND MEASUREMENT OF NUCLEAR RADIATION, by G. D. O'Kelley. Apr 62, 144p. 126 refs.

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Sandia Corp., Albuquerque, N. Mex.
COMMENTS ON THE QUANTITATIVE MEASUREMENT OF HIGH-ENERGY NEUTRONS EMITTED FROM A PULSED SOURCE, by J. C. Belote. Jan 62, 75p. 54 refs.

Nuclear Engineering and Power

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ELK RIVER REACTOR VESSEL CLADDING DEFECTS. Rept. on Contract AT(11-1)-654. 19 May 61, 34p. 7 refs.

ANL-6510 $1.00

Argonne National Lab., Ill.
HAZARD SUMMARY REPORT FOR THE ARGONNE AGN-201 REACTOR, ed. by K. C. Ruzich and W. J. Sturm. Rept. on Contract W-31-109-eng-38. Feb 62, 37p. 14 refs.

DCP-59-471 $11.00

Armour Research Foundation, Chicago, Ill.
FRONT AND REAR PLUG STUDIES, by H. J. Nielsen. Final rept. on Subcontract AT-91-9. 2 Feb 59, declassified 5 Dec 61. 142p.

NAA-SR-7098 $0.75

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CAPSULE IRRADIATION OF UNALLOYED URANIUM AT HIGH-TEMPERATURES, by D. G. Harrington and J. B. Newton. Rept. on Contract AT(11-1)-GEN-8. 15 Apr 62, 35p. 8 refs.

NAA-SR-6893 $0.75

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FEATURES OF THE SODIUM GRAPHITE REACTOR. Rept. on Contract AT(11-1)-GEN-8. 29 May 61, 16p.

NAA-SR-Memo-3486 $1.10

Atomics International, Canoga Park, Calif.
FURTHER STUDIES OF NUCLEAR PARAMETERS OF THE U-Mo FUELED HALLAM NUCLEAR FACILITY, by R. J. Doyas. Rept. on Contract AT(11-1)-Gen-8. 27 Jan 59, 8p.

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HALLAM NUCLEAR POWER, DRY CRITICALITY, by H. C. Kempt and W. P. Corcoran. Preparational test completion rept. on Contract AT(11-1)-GEN-8. 24 Feb 62, 49p.

AI-P-1163 $3.60

Atomics International, Canoga Park, Calif.
HALLAM NUCLEAR POWER FACILITY, DRY EXCESS LOADING, by H. C. Kempt and W. P. Corcoran. Preoperational test interim rept. on Contract AT(11-1)-GEN-8. 24 Feb 62, 33p.

TID-14980 $1.60

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MODERN STEAM CONDITIONS FROM A 360-MWE SODIUM-GRAPHITE REACTOR, by R. W. Dickinson and R. J. Beeley. Rept. on Contract AT(11-1)-GEN-8. Feb 62, 24p.

NAA-SR-TDR-6540 $2.60

Atomics International, Canoga Park, Calif.
PROPOSED REORIENTATION OF ATOMICS INTERNATIONAL ASCR PROGRAM. Rept. on Contract AT(11-1)-Gen-8. 27 June 61, 23p.

NAA-SR-Memo-4823 $2.60

Atomics International, Canoga Park, Calif.
RADIOLOGICAL HAZARDS FROM RUPTURE OF THE SECONDARY COOLANT SYSTEM OF THE 10 Mw ESCR, by A. R. Piccot. 3 Nov 61, 23p.

NAA-SR-Memo-3757 $1.10

Atomics International, Canoga Park, Calif.
RELEASE OF FISSION GASES FROM THE AE-6 REACTOR ON MARCH 25, 1959, by G. L. Blackshaw. 3 Nov 61, 11p.

NAA-SR-6879 $0.75

Atomics International, Canoga Park, Calif.
STABILIZING SRE FUEL ELEMENTS, by H. F. Donohue and H. A. Vislay. Rept. on Contract AT(11-1)-GEN-8. 15 Apr 62, 33p. 2 refs.

BMI-1569(Del.) $2.00

Battelle Memorial Inst., Columbus, Ohio
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING FEBRUARY, 1962, by Russell W. Dayton and Ronald F. Dickerson. Rept. on Contract W-7405-eng-92. 1 Mar 62, 86p. 2 refs.

BNL-696(S-59) $1.75

Brookhaven National Lab., Upton, N. Y.
NUCLEAR ENGINEERING DEPARTMENT PROGRESS REPT. May 1-August 31, 1961. Jan 62, 76p.

TID-12966 $1.60

Duquesne Light Co., Shippingport, Pa.
FEDAL SYSTEM OPERATION DURING STATION START-UP, CORE I, SEED 2. 21 June 61, 20p. DLCS 3500258; DLCS 3500259; and T-643734.

TID-14419 $7.60

Duquesne Light Co., Shippingport, Pa.
MONTHLY OPERATING REPORT, OCTOBER 1961, on Contract AT(11-1)-292. 11 Dec 61, 76p.

TID-14571 $14.00

Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
PROCEEDINGS OF THE FIRST SYMPOSIUM ON THE NUCLEAR ACCIDENT DOSIMETRY PROGRAM: TECHNIQUES AND USES. Oct 60, 101p.

PNE-115P $0.75

Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
TIMING AND FIRING, by N. Hagopian. Preliminary rept. on Plowshare Program, Project Gnome. 30 Apr 62, 25p. 25 refs.

DC-58-2-118 $21.00

General Electric Co., Cincinnati, Ohio
102 PROJECT DATA BOOK, by T. W. Schoenberger. 6th Issue, 14 Feb 58, declassified 8 Sep 61, 359p.

DC-59-8-127 $11.00

General Electric Co., Cincinnati, Ohio
COMPILATION OF UNCLASSIFIED PROJECT 102 CONTROLS AND INSTRUMENTATION SCHEMATIC DIAGRAMS, DRAWINGS AND PHOTOGRAPHS, by J. A. Showalter. 14 Aug 59, 134p.

DC-59-8-22 $23.50

General Electric Co., Cincinnati, Ohio
D102A DATA BOOK, 8TH ISSUE, by T. W. Schoenberger. Rept. on Contract AT(11-1)-171. 29 July 59, 513p. Supersedes DC-58-10-159.

XDCL-59-5-92. $1.60

General Electric Co., Cincinnati, Ohio.
INVENTION DISCLOSURE, PNEUMATIC LATCH, by LeRoy E. Eckart. Rept. on Contract AT(11-1)-171. 30 Apr 59, 15p.

DC-57-7-177 $8.10

General Electric Co., Cincinnati, Ohio
OPERATION AND PERFORMANCE OF POWER RANGE SYSTEM AND CHANNEL SELECTOR CIRCUITRY; PROJECT 102 CONTROL SYSTEM, by James E. Mott. Rept. on Contract AT(11-1)-171. 23 July 57, 76p.

DC-59-10-101 $12.50

General Electric Co., Cincinnati, Ohio
P-103 CONTROL ACTUATOR PNEUMATIC SERVO VALVE DEVELOPMENT, by L. C. White. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. Sep 59, 179p.

XDC-55-9-158 $14.50

General Electric Co., Cincinnati, Ohio
PRELIMINARY HTRE #1 PROJECT 100 OPERATION MANUAL 21, REACTOR ASSEMBLY, CORE "A". 28 Sep 55, declassified 10 Aug 61. 209p.

DC-58-5-76 $10.50

General Electric Co., Cincinnati, Ohio
RESULTS OF STRUCTURAL TEST PERFORMED ON P-102 INNER PRESSURE VESSEL (DRAWING NO. 134R604, by E. Ratterman. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 8 May 58, 132p.

PRWRA-GNEC-5(Bks I&II) $7.00(Set)

General Nuclear Engineering Corp., Dundedin, Fla.
BOILING NUCLEAR SUPERHEATER (BONUS) POWER STATION. Final hazards summary rept. on Contracts AT(40-1)-2674 and AT(40-1)-2672. 1 Feb 62, 659p. 72 refs.

HW-71260 $1.75

Hanford Atomic Products Operation, Richland, Wash.
COMPILATION OF DECONTAMINATION DATA: SUPPLEMENT TO PROGRESS REPORTS HW-67937 AND HW-71259, by A. P. Larrick, R. B. Richman, and R. D. Weed. Rept. on Contract AT(45-1)-1350. 16 Feb 62, 66p.

HW-73398 $0.50

Hanford Atomic Products Operation, Richland, Wash.
STRENGTH AND METALLURGICAL PROPERTIES OF THE ZIRCALOY-2 PRESSURE TUBES FOR THE PRTR, by R. L. Knecht and P. J. Pankaskie. Rept. on Contract AT(45-1)-1350. Mar 62, 19p. 10 refs.

PNE-127P $0.75

Holmes and Narver, Inc., Los Angeles, Calif.
PRE-SHOT AND POST-SHOT STRUCTURE SURVEY. Rept. on Plowshare Program, Project Gnome. 6 Apr 62, 11p. 25 refs.

NYO-9726 $10.50

Jackson and Moreland, Inc., Boston, Mass.
PM-3A NUCLEAR POWER PLANT SECONDARY SHIELD DESIGN, by W. C. Siler. Rept. on Contract AT(30-1)-2749. Sep 61, 136p. 34 refs.

NYO-9614 $9.10

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
CYCLIC TEST OF N. S. SAVANNAH REACTOR VESSEL MODEL, by Thomas Stilwell and Kenneth R. Stearns. Rept. on Contract AT(30-1)-2129. Sep 61, 106p.

FI-A2150-2

UCRL-6729 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
REACTIVITY EFFECTS OF VARIOUS REFLECTORS ON NEAR-HOMOGENEOUS, BeO-MODERATED, ORALLOY-FUELED SYSTEMS, by John R. Morton, Frederick J. Shon and others. Rept. on Contract W-7405-eng-48. 2 Jan 62, 21p. 5 refs.

MND-M-1820 $2.25

Martin Marietta Corp., Baltimore, Md.
PM-1 NUCLEAR POWER PLANT PROGRAM. Quarterly progress rept. no. 9, 1 Mar-31 May 61, on Contract AT(30-1)-2345. 10 July 61, 103p. 2 refs.

MND-P-2483-5 $1.00

Martin Marietta Corp., Baltimore, Md.
SNAP 7 PROGRAM. TASK 8, -STRONTIUM-90 FUELED THERMOELECTRIC GENERATOR DEVELOPMENT. Quarterly progress rept. no. 5, 1 Nov 61-31 Jan 62, on Contract AT(30-3)-217. May 62, 36p. 7 refs.

NYO-9715 $6.00

Massachusetts Inst. of Tech., Cambridge.
THE EFFECT OF FUEL AND POISON MANAGEMENT ON NUCLEAR POWER SYSTEMS, JUNE 1959-SEPTEMBER 1961, by N. B. McLeod, M. Benedict and others. Rept. on Contract AT(30-1)-2073. 15 Sep 61, 508p. 46 refs.

NAA-SR-193 $1.60

North American Aviation, Inc., Downey, Calif.
PULSE-ANNEALING OF RADIATION ANNEALED HANFORD GRAPHITE SAMPLES, by A. S. Hook. Rept. on Contract AT(11-1)-Gen-8. 27 Oct 52, 19p.

CEX-62.02 $2.25

Oak Ridge National Lab., Tenn.
OPERATION PLAN AND HAZARDS REPORT. OPERATION BREN, by F. W. Sanders, F. F. Haywood and others. Apr 62, 102p. 36 refs.

SC-4680(M) $0.50

Sandia Corp., Albuquerque, N. Mex.
HEALTH PHYSICS ASPECTS OF THE START-UP AND OPERATION OF THE SANDIA PULSED REACTOR FACILITY (SPRF), by William D. Burnett, Harold L. Rarrick and others. May 62, 20p.

YAEC-132 $1.50

Westinghouse Electric Corp., Pittsburgh, Pa.
TRANSIENT BOILING BEHAVIOR OF THE YANKEE REACTOR FOLLOWING LOSS OF COOLANT FLOW, by J. P. Cunningham, J. M. Gallagher, Jr., and T. Gogniat. Rept. on Contract AT(30-3)-222. July 61, 61p. 10 refs.

Nuclear Reactions

NYO-9285 $9.60

Carnegie Inst. of Tech., Pittsburgh, Pa.
INELASTIC PROTON-PROTON SCATTERING AT 1.3 Bev., by Nguyen Chi Hien. Rept. on Contract AT(30-1)-882. May 61, 118p.

NEVIS-102 $2.60

Columbia U., New York
THE SCATTERING OF 6-24 MEV NEGATIVE PIONS BY HYDROGEN, by Enid Bierman. Rept. on Contract AT(30-1)-1932. Feb 62, 29p.

GA-2492 $9.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
SUMMIT. AN IBM-7090 PROGRAM FOR THE COMPUTATION OF CRYSTALLINE SCATTERING KERNELS, by Joan Bell. Rept. on Contract AT(04-3)-314. 1 Feb 62, 113p.

TID-15126 $4.60

Nebraska U., Lincoln
ENERGY AND ANGULAR DISTRIBUTIONS OF SECONDARY ELECTRONS FROM HELIUM GAS BOMBARDED BY PROTONS, by M.E. Rudd. Rept. on Contract AT(11-1)-35. [1961] 44p.

TID-13492 $12.00

Pennsylvania U., Philadelphia
PHOTONUCLEAR ACTIVATION BY 20 MEV GAMMA RAYS, by Walter DelBianco. Technical rept. no. 9, on Contract Nonr 551(17). 28 Dec 61, 160p. 113 refs.

TID-15161 $8.60

Purdue U., Lafayette, Ind.
THE DECAY OF Ru^{105}, Pd^{109}, AND Rb^{86}, PART I. THE FISSION OF GOLD WITH INTERMEDIATE ENERGY HELIUM IONS, PART II. by Henry W. Brandhorst, Jr. Doctoral thesis, Rept. on Contract AT(11-1)-347. Aug 61, 98p.

Radioactivity

NAA-SR-Memo-5182 $1.60

Atomics International, Canoga Park, Calif.
SHIELDING ANALYSES FOR THE HNPF FUEL ELEMENT SHIELD PLUGS, by S. Berger. Rept. on Contract AT(11-1)-Gen-8. 14 Apr 60, 13p.

DC-60-4-172 $2.60

General Electric Co., Cincinnati, Ohio
A COMPARISON OF CALCULATED AND MEASURED CREW SHIELD CAPTURE GAMMA RAYS, by L. S. Burns, Jr. Rept. on Contract AT(11-1)-171. 27 Apr 60, 23p.

PERSONNEL SUPPLIES AND PERSONAL EQUIPMENT

PB 159 959 $4.60

Human Resources Research Office, George Washington U., Washington, D. C.
AN ANNOTATED BIBLIOGRAPHY ON THE AUTOMATION OF INSTRUCTION, by Charles L. Darby. Research memo. July 59, 43p. 95 refs; AD-228 766.

DESCRIPTORS: *Automation, *Teaching machines, Learning, Education, Training, *Bibliography, Abstracting.

Articles and reports on individual teaching devices, group instructional devices, theoretical issues and learning theories were drawn from the psychological, military, and educational literature. Some unpublished reports are included. The addresses of authors of unpublished papers are appended. Abstracts present only the general conclusions of experimental research or a general brief of the content of non-experimental articles. Where appropriate summaries were furnished with articles, these have been reproduced verbatim and are so indicated by quotation marks.

PHYSICS

NAA-SR-Memo-6662 $2.60

Atomics International, Canoga Park, Calif.
RESULTS OF THE S2DR REACTOR NOISE EXPERIMENT, by R. L. Randall. Rept. on Contract AT(11-1)-Gen-8. 18 Aug 61, 26p.

UCRL-9988 $0.50

Lawrence Radiation Lab., U. of California, Berkeley.
THEORY OF THE FULLY IONIZED PLASMA COLUMN WITH EXTERNAL PARTICLE PRODUCTION. I, by Gunter Ecker. Rept. on Contract W-7405-eng-48. 15 Dec 61, 23p. 11 refs.

LA-2667 $1.50

Los Alamos Scientific Lab., N. Mex.
MIXTURE THEORIES APPLIED TO SYSTEMS OF RIGID SPHERES, by Z. W. Salsburg and Wildon Fickett. Rept. on Contract W-7405-eng-36. 7 May 62, 60p. 26 refs.

TID-15043 $11.50

Nebraska U., Lincoln.
A CALORIMETRIC MEASUREMENT OF THE X-RAY PRODUCED STORED ENERGY IN SODIUM CHLORIDE, by Fred T. Phelps, Jr. Doctor's thesis. Rept. on Contract AT(11-1)-525. July 61, 152p.

TID-15129 $1.10

Nebraska U., Lincoln.
MEASUREMENTS OF $\sum_f \sigma_{of}$ BY ATTENUATION OF NEUTRAL OXYGEN ION BEAM IN A GAS IN THE PRESENCE OF A TRANSVERSE MAGNETIC FIELD, by Theodore Jorgensen, Jr., and Wayne Lang. Progress rept. on Contract AT(11-1)-35. 1962. 7p.

TID-15066 $2.60

New York U., N. Y.
THE USE OF ATOMIC BEAMS AS A PROBE FOR STUDYING LOW DENSITY PLASMAS, by B. Bederson, K. Rubin, and others. Rept. on Contract AT(30-1)-2397. 1962. 23p.

PB 181 303 $2.00

Plastics Lab., Princeton U., N. J.
SEMI-CONDUCTION IN POLYMERS (A REVIEW), by Herbert A. Pohl. Rept. on Contract DA 36-039-sc-78105. 31 Mar 61, 76p. 136 refs. Technical rept. 61D; AD-254 793.

DESCRIPTORS: *Polymers, *Semiconductors, *Bibliography, Plastics, Electrical properties, Theory, *Conductivity, Organic compounds, Organic materials, Electron transitions, Synthesis.

A review is presented of the electronic behavior of polymeric materials as well as of substances other than polymeric materials which would contribute to the understanding of the behavior of polymers. Consideration is given to super-polymer, quasi-polymer, and monomeric materials. The interpretation of semiconduction and related electronic processes in organic substances is discussed in terms of (1) the band theoretical model, in which it is presumed that conductivity, in intrinsic materials, arises from thermal causes; and (2) the hopping process model, in which it is assumed that the hopping of carriers includes transfer of charge through the medium by either of 2 mechanisms. These mechanisms are: (1) coupled ion movement involving the process of radiation of a quantum and its reabsorption elsewhere in the medium, and (2) tunneling ionic charge.

TID-15135 $2.60

Yale U., New Haven, Conn.
STRUCTURE OF LIQUID METALS, by R. B. Gordon. Progress rept. June 61 - Feb 62, on Contract AT(30-1)-2029. Feb 62, 30p.

Electronics

NASA N62-10902 $9.10

Stanford Research Inst., Menlo Park, Calif.
THEORETICAL RESEARCH -- ELECTRONIC, IONIC, AND ATOMIC IMPACT PHENOMENA. Annual Report No. 4, 9 Oct. 1960 to 31 Dec. 1961, by Charles J. Cook. Dec. 31, 1961. [104] p. 82 refs. NASA Contract NASw-80; SRI Project No. SU-3023.

TID-14666 $1.60

W. W. Hansen Labs. of Physics, Stanford U., Calif.
PRIMARY BEAM SCATTERING IN A MERCURY-VAPOR DISCHARGE, by F. W. Crawford. Rept. on Contract AT(04-3)-326. Dec 61, 15p. ML-872.

Molecular Physics and Spectroscopy

TID-15199 $14.00

Purdue Research Foundation, Lafayette, Ind.
STUDIES IN MOLECULAR SPECTROSCOPY. THE HIGH RESOLUTION INFRARED SPECTRA OF THE METHYL DERIVATIVES OF TIN TETRACHLORIDE. THE APPLICATION OF THE VIBRATIONAL SPECTRA, by Peter W. Moore. Doctor's thesis. Rept. on Contract AT(11-1)-164. June 61, 205p.

TID-15193 $10.10

Purdue Research Foundation, Lafayette, Ind.
STUDIES IN MOLECULAR SPECTROSCOPY. THE SUBSTITUENT EFFECT AND INFRARED FREQUENCIES AND INTENSITIES. THE GENERAL THEORY. SUBSTITUTED ACETYLENES, by Robert W. Bayer. Doctor's thesis. Rept. on Contract AT(11-1)-164. Aug 61, 125p.

TID-15200 $9.10

Purdue Research Foundation, Lafayette, Ind.
VIBRATIONS OF LARGER MOLECULES. GENERAL METHODS APPLICATION TO THE METHYL DERIVATIVES OF TIN TETRACHLORIDE, by Walter F. Edgell, P. W. Moore, and C. H. Ward. Rept. on Contract AT(11-1)-164. 1960. 109p.

TID-15192 $7.60

Purdue U., Lafayette, Ind.
STUDIES IN MOLECULAR SPECTROSCOPY. AN IMPROVED PREPARATION OF THE NITROSYLCARBONYLFERRATE ANION. ITS INFRARED SPECTRUM IN SOLUTION, by Jean Jacques Rosaz. Master's thesis. Rept. on Contract AT(11-1)-164. Jan 62, 74p.

TID-15201 $8.60

Purdue U., Lafayette, Ind.
THE SUBSTITUENT EFFECT AND INFRARED FREQUENCIES AND INTENSITIES. THE GENERAL THEORY. SUBSTITUTED ACETYLENES, by Walter F. Edgell, Robert W. Bayer, and others. Rept. on Contract AT(11-1)-164. [1960] 100p.

Y-1385 $0.50

Union Carbide Nuclear Co., Oak Ridge, Tenn.
AUTOMATIC MASS SPECTROMETER FOR ISOTOPIC ANALYSIS OF LITHIUM, by W. T. McBryde and E. F. Gammon, Rept. on Contract W-7405-eng-26. 15 Mar 62, 23p.

Optics

PB 181 304 $1.50

Elcon Lab., Inc., Cambridge, Mass.
UV TRANSMISSION TESTS, by Edwin Olsson and Edwin Langberg. Final rept. on Contract ARSD-478. 2 Apr 62, 51p. 5 refs.

DESCRIPTORS: *Ultraviolet radiation, Propagation, Tests, Attenuation, Scattering, *Transmission, Meteorology, Visibility, Aerosols, Atmosphere, Air to air, Flight instruments, Feasibility studies.

This report contains the results and conclusions of propagation measurements taken in the UV region. A UV light propagation range was set up to the west of L. G. Hanscom Field, Bedford, Massachusetts. The purpose of the test was to obtain data as to the attenuation and scattering properties of UV light under various weather conditions, both day and night. Over the range of 2.3 km using a mercury line at 2537°. A consistent reception of the UV signal was achieved under conditions of visibility which equalled or exceeded this range. An attempt to receive scattered radiation over the same range was unsuccessful under various visibility conditions. Similarly UV photographs failed to show any indication of scattered radiation. Scatter radiation was received at a shorter range of .84 km. The above results may be adequately accounted for on the assumption that in addition to oxygen absorption there is also another absorbing ingredient in the atmosphere. It is likely that this additional ingredient is ozone. This series of tests has determined that attenuation is excessive for an air-to-air pilot warning instrument of 10 to 15 miles range without the use of inordinately high power.

UCRL-6769 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
LASERS, A BIBLIOGRAPHY, by Carl J. Wensrich. Rept. on Contract W-7405-eng-48. Jan 62, 14p.

Solid State Physics

TID-14396 $4.60

Arizona State U., Tempe
CERTAIN ELECTRICAL AND OPTICAL PROPERTIES OF A COLLOIDAL PHASE IN A SOLID, by B. R. Gossick. Final rept. Part II, on Contract AT(11-1)-715. Oct 61, 43p. 27 refs.

Order from GPO $0.10 as I 28.23:5907

Bureau of Mines, Washington, D. C.
FIELD TEST FOR GERMANIUM, by W. M. Dressel. 1962, 4p. 6 refs. Rept. of Investigations 5907.

DESCRIPTORS: *Semiconductors, *Germanium, Sources, Rock, Coal, Particles, Detection, Production.

The method consists of dissolving germanium from the samples by either acid or fusion treatment methods, adding a few drops of hematein of phenylfluorone dye, and extracting the resulting colored complex with carbon tetrachloride. (Author)

TID-14981 $2.60

California Inst. of Tech., Pasadena.
METASTABLE SIMPLE CUBIC STRUCTURES IN GOLD-TELLURIUM AND SILVER-TELLURIUM ALLOYS, by Huey-Lin Luo and William Klement, Jr. Technical rept. no. 2 on Contracts AT(04-3)-221 and Nonr-220(30). Feb 62. 25p.

TID-15067 $8.60

Illinois U., Urbana.
CRYSTALLIZATION OF THE PEROVSKITE LEAD TITANATE FROM GLASSES, by C. G. Bergeron, C. K. Russell, and A. L. Friedberg. Summary rept. no. 2 on Contract AT(11-1)-915. 15 Feb 62, 98p.

TID-15085 $1.60

International Business Machines Corp., Yorktown Heights, N. Y.
THE ZENER RELAXATION AS A DISTRIBUTION OF RELAXATION TIMES, by A. S. Nowick and B. S. Berry. Rept. on Contract AT(30-1)-2811. 10 Aug 61, 20p.

TID-15041 $5.60

Nebraska U., Lincoln
PROGRESS REPORT [ON X-IRRADIATED CRYSTALS, IONIC CONDUCTIVITY OF NaCl AND RADIATION DAMAGE TO Cu]. Rept. on Contract AT(11-1)-525. 1 Feb 62, 54p.

TID-15010 $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
DETERMINATION OF THE CRYSTAL STRUCTURES OF THE URANYL CUPFERRATES AND NEO-CUPFERRATES BY X-RAY DIFRACTION METHODS, by J. Lawrence Katz. Annual rept. no. 3 on Contract AT(30-1)-2325. Jan 62, 5p.

TID-15138 $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
THE INFLUENCE OF GRAVITY UPON THE SHRINKAGE OF COPPER POWDER COMPACTS, by F. V. Lenel, H. H. Hausner, and others. Rept. on Contract AT(30-1)-2408. 1961. 9p.

SCR-502 $0.50

Sandia Corp., Albuquerque, N. Mex.
THE PIEZOELECTRIC RESPONSE OF QUARTZ BEYOND ITS HUGONIOT ELASTIC LIMIT, by F. W. Neilson and W. B. Benedick. Apr 62, 16p. 9 refs.

TID-15217 $2.60

Syracuse U., N. Y.
THE CRYSTAL STRUCTURE OF Sr_6Li_{23} AND Sr_3Li_2, by Frederick E. Wang, Aden J. King, and Frank A. Kanda. Publication no. 2 on Contract AT(30-1)-1910. [1962] 23p.

Thermodynamics

ANL-6528 $1.25

Argonne National Lab., Ill.
COMBINED FORCED AND FREE TURBULENT CONVECTION IN A VERTICAL TUBE, by M. S. Ojalvo and R. J. Grosh. Rept. on Contract W-31-109-eng-38. Jan 62, 50p. 62 refs.

NAA-SR-Memo-4093 $8.60

Atomics International, Canoga Park, Calif.
STEADY STATE THERMAL BEHAVIOR OF HNPF SODIUM HEAT TRANSFER SYSTEM, by A. T. Stell. Rept. on Contract AT(11-1)-Gen-8. 10 Aug 59, 92p.

DC-57-8-150 $1.60

General Electric Co., Cincinnati, Ohio
CALIBRATION OF RHENIUM-MOLYBDENUM AND RHENIUM-TUNGSTEN THERMOCOUPLES TO 3200°F, by John C. Lachman. Rept. on Contract AT(11-1)-171. 21 Aug 57, 16p.

DC-55-11-127 $8.10

General Electric Co., Cincinnati, Ohio
METHOD OF THERMAL STRESS ANALYSIS OF REACTOR SHIELD ASSEMBLIES, by H. A. Eagle, R. J. Kroll and others. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 25 Nov 55, declassified 10 July 61. 89p.

NASA N62-10689 $3.60

Heat Transfer Lab., U. of Minnesota, Minneapolis
THERMAL RADIATION ABSORPTION IN RECTANGULAR-GROOVE CAVITIES, by E. M. Sparrow and V. K. Jonsson. [1961]. 20[11]p. 6 refs. NASA Grant NsG 137-61.

TID-15196 $12.00

Illinois U., Urbana.
SPECIFIC HEAT OF He^3, by Gerhard L. Salinger. Technical rept. no. 1 on Research on the Properties of Materials at Low Temperature, Contract AT(11-1)-1056. Sep 61, 166p.

UCRL-6785 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
ESTIMATION OF HIGH-TEMPERATURE HEAT CAPACITIES OF CARBIDES, by Oscar H. Krikorian. Rept. on Contract W-7405-eng-48. 6 Feb 62, 9p. 5 refs.

LAMS-2640 $1.50

Los Alamos Scientific Lab., N. Mex.
THERMODYNAMIC PROPERTIES OF SEVEN METALS AT ZERO PRESSURE, by William J. Carter Rept. on Contract W-7405-eng-36. 9 May 62, 60p. 127 refs.

TID-14392 $3.60

Michigan U., Ann Arbor
LOW TEMPERATURE CHEMICAL THERMODYNAMICS PROJECT. Technical progress rept. no. 9, Nov 60-Nov 61, on Contract AT(11-1)-70. 14 Nov 61, 37p. 40 refs.

Order from GPO $0.25 as C 13.44:41

National Bureau of Standards, Washington, D. C.
THEORY AND METHODS OF OPTICAL PYROMETRY by H. J. Kostkowski and R. D. Lee. 1 Mar 62, 28p. 31 refs. NBS Monograph 41.

DESCRIPTORS: *Optics, *Pyrometers, Optical equipment, Theory, Sources, Blackbody radiation, Tungsten, Filaments, Carbon arc lamps, Calibration, Temperature, Measurement, Instrumentation, Scale.

A detailed review of the theoretical methods of optical pyrometry and the application of these methods in realizing, maintaining and distributing the International Practical Temperature Scale above 1063°C is presented. The concepts of effective and mean effective wavelengths are introduced, and various equations relating these parameters to each other and other physical quantities are derived. Features of precision visual optical pyrometers are discussed and a number of blackbody sources and tungsten strip lamps described. Experimental procedures and results of primary and secondary calibrations of optical pyrometers are given. Recommendations for achieving high precision and accuracy and the fundamental limitations in visual optical pyrometry are presented. (Author)

Order from GPO $0.30 as C 13.44:40

National Bureau of Standards, Washington, D. C.
THERMOCOUPLE MATERIALS, by F. R. Caldwell. 1 Mar 62, 43p. 128 refs. NBS Monograph 40.

DESCRIPTORS: *Thermocouples, *Materials, Metals, Refractory materials, Carbon, Carbides, Temperature, Mechanical properties, Specific heat, Thermal conductivity.

Thermocouple materials are considered that are used primarily as immersion temperature sensors in the range from 0°C up. Included are the conventional thermocouples, newer noble metal thermocouples, and thermocouples of refractory metals for use in the extreme range for immersed sensors. Limitations of the thermocouple wires are given as to range, stability, environment including atmosphere, magnitude of thermoelectric emf, and accuracy of commercially available materials of standard and extra quality. The properties of ceramic-packed thermocouples are presented.

TID-14462 $12.00

Purdue Research Foundation, Lafayette, Ind.
FREE CONVECTIVE HEAT TRANSFER TO A SUPER CRITICAL FLUID. AN ANALYTICAL AND EXPERIMENTAL STUDY, by C. A. Fritsch and R. J. Grosh. Rept. no. 9 on Contract AT(11-1)-1026. Nov 61, 154p. 59 refs.

Wave Propagation

NASA N62-10756 $4.60

Antenna Lab., Ohio State U. Research Foundation, Columbus
A THEORETICAL MODEL FOR SCATTERING FROM ROUGH SURFACES, WITH APPLICATIONS TO THE MOON AND SEA, by Randolph H. Ott. 10 Nov 61. 42 p. 24 refs. Report 1388-1; NASA Grant NsG 213-61.

NASA N62-10745 $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
REPRESENTATION OF PROPAGATION PARAMETERS FOR THE PLASMA IN A MAGNETIC FIELD, by Richard E. Haskell and E. Howard Holt. June 61. 3[4]p. 3 refs. Plasma Research Lab. Tech. Rep. -2; NASA Grant NsG 48-60.

NASA N62-10746 $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
STUDY OF ELECTROMAGNETIC WAVE POLARIZATION IN MAGNETO-PLASMAS BY A MATRIX METHOD OF CRYSTAL OPTICS, by Richard E. Haskell and E. Howard Holt. June 61. 2[1]p. 2 refs. Plasma Research Lab. Tech. Rept. 3; NASA Grant NsG 48-60.

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

ANL-6533 $0.50

Argonne National Lab., Ill.
A PINHOLE CAMERA AUTORADIOGRAPHIC TECHNIQUE FOR ENCAPSULATED IRRADIATED FUEL SPECIMENS, by W. N. Beck. Rept. on Contract W-31-109-eng-38. Apr 62, 8p. 1 ref.

PB 159 978 $4.60

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF TELETYPEWRITER MODIFICATIONS FOR AUTOMATIC GROUND/AIR/GROUND COMMUNICATION SYSTEM (AGACS), by Carlo Yulo and W. F. Sullivan. Final rept. Oct 61, 48p. Task no. 112-4-3T, Phase A.

DESCRIPTORS: *Air traffic control systems, Surface to air, Air to surface, *Communication systems, *Teletype systems, Tests, Radiofrequency, Data transmission systems, Automatic, Communication equipment.

The installation and checkout of the teletypewriter modification for AGACS was accomplished. Additional modifications were required to establish satisfactory performance of the modified system. Ground and flight tests were conducted to determine the capabilities and limitations of the system as modified for transmission of teletypewriter information or extended-length messages. (Author)

MISCELLANEOUS

PB 181 073 $1.25, $10.00/year

Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS June 62.

DESCRIPTORS: *Naval research, *Scientific research, Very high frequency, Ultra high frequency, Radar antennas, Meteorological radar, Angle of attack indicators, Atmosphere, Astrophysics, Calorimeters, Chemistry, Fluorides, Electricity, Diodes, Inverter circuits, Voltage, Photoelectric cells, Mathematics, Digital computers, Programming, Dictionaries, Mechanics, Bolts, Load distribution, Shear stresses, Metallurgy, Ceramic materials, Magnesium compounds, Phosphorus compounds, Stability, Surfaces, Fatigue (Mechanics) Nickel, Creep, Rupture, Oxides, Aluminum, Nickel alloys, Palladium alloys, Thermoelectricity, Pressure vessels, Steel, Radiation effects, Iron alloys, Chromium alloys, Oxidation, Water vapor, Vapor pressure, Nuclear physics, Physics, Hydrogen, Helium, Plasma physics, Radio, Gas leaks, Detectors, Solid State physics, Dosimeters, Indium, Superconductivity, Sound, Transducers, Acoustics, Special functions, Scheduling, Ultrasonics, Soldering, Patents

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